International Management Digest

MAY 1958
ONE DOLLAR (U.S.)

THE McGRAW-HILL PUBLICATION OF WORLD BUSINESS INFORMATION

Eugenio Mendoza: A man of business becomes a man of government in Venezuela. —page 11

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LOOKING AHEAD — World Affairs

Bottom of the Slide?

Maybe it was the belated arrival of Spring, maybe wishful thinking. Yet there were some hopeful signs that the American recession was touching bottom as INTERNATIONAL MANAGEMENT DIGEST went to press last month.

The world may see some gloomy unemployment figures for March. But it is more important to note the statistics on the number of people at work. Any rise there is a sign that the bottom of the slide is near at hand.

Other omens: Machine tools—the "machines that make machines"—are enjoying an upturn in orders. Inventory liquidation in many lines seems to have gone the limit. U. S. exports and imports have been holding up.

All eyes are on the consumer. He is saving more, and by doing so may be aggravating the recession in durable goods. Meanwhile, you hear some business advisers telling individuals that now is the time to purchase cars, household equipment, even real estate at favorable prices. And they are suggesting that businessmen can find bargains and cheaper financing for materials and equipment, and investors can select attractive stocks.

If such advice is taken by enough people, the recession will end—fast.

It may not, of course. Many expert observers, eyes on the tremendous industrial capacity added during the past five years, do not look for an upturn before next autumn, or even 1959. If that is the case, the world will see the most important test to date of whether a modern government can, or will, take the right actions to cure a serious slump.

A View from Europe

Though they see their own industrial production slowing, Europeans are optimistic about the U. S. economy. Their main worry: a shrinkage of world trade later in 1958.

Note the latest cut in the British bank rate—to 6% in March. It may drop to 5% or less by summer, in the opinion of Business Week magazine. That would give the Bank of England room to raise the rate when the seasonal pressure on sterling comes next autumn.

Yet sterling is doing well. Barring a sudden drastic slump in trade, British officials expect the sterling area to come through 1958 without much strain. They believe that Britain itself will have a very large payments surplus this year—big enough, in fact, to offset the drop in the earnings of sterling area raw material producers.

Commodity Worries

No doubt that the raw material producers are hurting most. And their reaction may well take the form of more price support schemes.

In an analysis of existing schemes, The Economist points out that the best support is that which a single large producer can enforce. Thus International Nickel Co. can cut production—as it just did—by 10% with fair hope of success. And the Diamond Syndicate can fall back on its substantial reserve funds.

Turn the page for more WORLD AFFAIRS

Formal producers' agreements do not always work so well. Thus the tin council is battling hard against severe pressures from non-member producers; and the sugar agreement actually covers only 10% of world output. The wheat agreement has no powers to regulate production; furthermore, the largest importer—Britain—is not a member.

Less formal arrangements—such as the copper industry's cutbacks and the Latin American plan to ration coffee exports—are even weaker. But at least they are less ambitious, seeking only to "smooth out" fluctuations rather than to maintain a firm price.

For all their drawbacks, The Economist expects more formal commodity control plans to appeal. Tea, rubber, coffee are possibilities.

In the end, the "almost bottomless American purse" is the best support. The fairly steady prices of corn, wheat, and cotton testify to the effectiveness (if not the economics) of U.S. government price supports.

$30,000,000,000 for Petroleum

Huge supplies, weakening prices, reduced earnings—and an expanding and costly hunt for new reserves. This is the paradox of petroleum.

International spending by the oil companies, especially the Americans, may be larger in 1958 than in 1957. Look for continued high investment in Venezuelan facilities, in Central America, Bolivia, even Paraguay. . . . The pressure on the state oil companies of Brazil, Mexico, Argentina to speed the hunt is inexorable. . . . There will be further expansion in the Middle East, Algeria, as well as other parts of Africa.

Why such spending in time of surplus? U.S. petroleum men (and many more of them are looking overseas) explain that they must maintain their proportionate share in world reserves to meet long-range demand. Finding oil becomes steadily more expensive in the U.S.A.

The chairman of one of the largest companies guesses that American companies alone will spend some $30,000-million overseas, much of it on exploration and drilling, in the next five years.

The March of Business

While shipping slumps (at least 100 tankers tied up, cargo rates low), world shipyards are booming with $13,000-million of work in process or on order, enough to keep them busy until the 1960s. True, there have been about 60 new-ship cancellations, but not many more are expected.

Managers—and their lawyers—are confused by the sweeping anti-cartel provisions of the European Common Market Treaty; as a result, contracts, joint ventures, other business deals in Europe are held up. The International Chamber of Commerce has asked the six governments to postpone acting upon the provisions until the rules can be made clear.

More mergers and joint ventures are required if Europe's steel industry is to gain higher productivity and lower costs. So says Hans-Guenther Sohl, head of the German Iron & Steel Federation. He especially urges joint international projects to develop raw material resources.

Japanese trade and investment in Brazil grows fast. Biggest deal so far is a $20-million shipyard in Rio de Janeiro. Another involves Hitachi Ltd.'s contract to supply two big generators to the Paulo Afonso power plant—one of Japan's largest single electrical export orders. Other projects include a banking service in Brazil, a steel mill, vegetable oil refining, sewing machine manufacture, possibly pulp and paper production.

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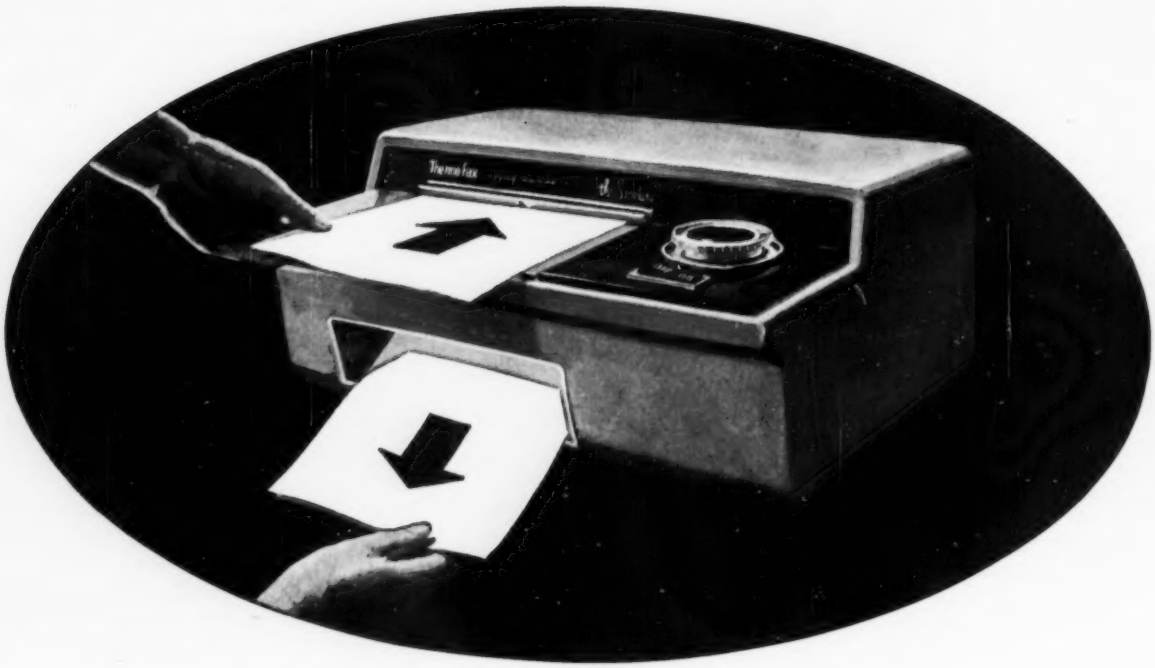

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International Management Digest

MAY 1958
VOL. 13 NO. 5

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NEW YORK CITY
MAY 1958

The Readers Report . . .

Cablegram from Cuba

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PEDRO G. DE CESPEDES
President
ASOCIACION PRO TECNICA
ADMINISTRATIVA
HAVANA

● No slight to APTA was intended. The reference was to efforts to organize affiliates of PACCIOS, the Pan American Council of the world-wide Committee for Scientific Management.—EDITOR

Too Many Zeros

Sir . . . It is with interest that I read your article on advertising. However, one point puzzled me as far as the statistics for South Africa are concerned.

Whereas the total advertising volume is stated at $44,480,000, the media breakdown totals over $120,000,000. Could you explain?

K. W. KING
Secretary
SPARHAM & FORD
JOHANNESBURG

● INTERNATIONAL MANAGEMENT DIGEST added a few zeros where it should not have. The $44,480,000 is correct as estimated by the International Advertising Assn. The media breakdown should have read: Newspapers, $30,828,500; radio, $2,465,400; cinema and outdoor, $4,619,876; direct mail, etc., $6,566,252.

—EDITOR

Business in Australia

Sir . . . As a regular reader of your publication and its interesting comments on business affairs in America and elsewhere, I realize that in addition to information supplied by your own staffs, you also receive items of general interest from correspondents.

With this in mind, I thought you would be interested in the publications produced by the Department of Trade of Australia. I have found that the standard of these publications is improving, and the range of information they cover makes them a worthwhile summary of business in this country.

Turning again to INTERNATIONAL MANAGEMENT DIGEST, the depth of knowledge and breadth of experience make the writing very interesting as well as providing useful stimulating thought. Please accept my thanks for past information, and I look forward to further enjoyment.

J. B. REID
HARDIE HOLDINGS LTD.
SYDNEY, AUSTRALIA

● Thanks to Mr. Reid for an excellent suggestion—for us and for any businessmen interested in Australia. Write to the Dept. of Trade, Melbourne, Australia, if you are interested.

—EDITOR

The Editor Reports . . .

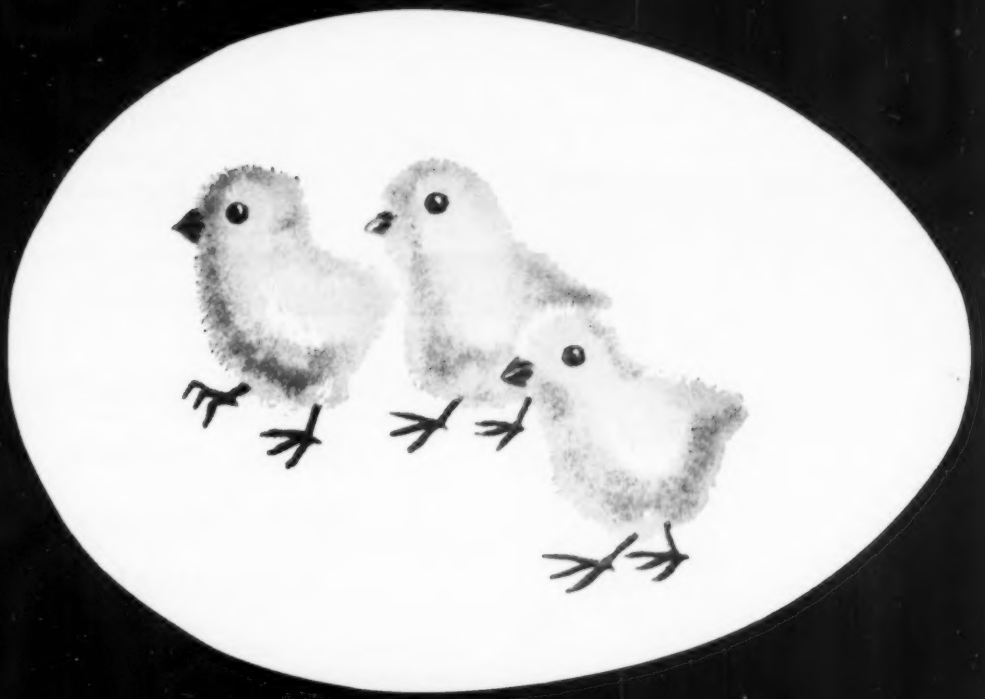
This month, INTERNATIONAL MANAGEMENT DIGEST presents its new face to the world. It was months in preparation. A new cover design, you may be sure, requires a lot of trial-and-error; in the process, a good deal of artists' ink is spilled.

In the end, the white cover you see today prevailed. We believe it is more modern and compelling. And certainly it will allow more effective use of cover portraits and color.

The most important aspect of the change, we believe, is the prominence given to "International" in the magazine's name. This will help make clear to everyone something the readers already know—that this is an international publication, edited exclusively for businessmen around the world and devoted exclusively to their interests.

We are proud that a businessman of the international stature of Eugenio Mendoza "inaugurates" our new cover. A successful manager and a philanthropist, Mr. Mendoza has recently taken on the exacting responsibilities of government in Venezuela (page 11). We wish him and his Venezuelan colleagues the greatest success in their task.

Paul R. Miller, Jr



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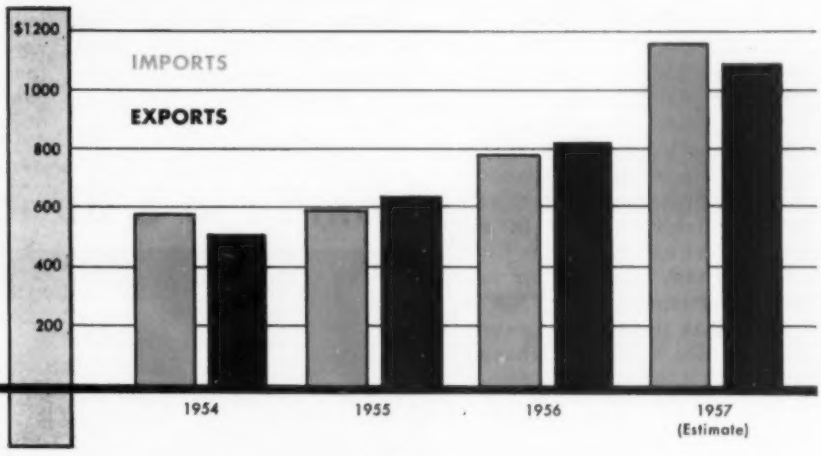
The Russians increase their trade with non-Communist markets



How Much Business with Russia?

Moscow has begun to stir the intense curiosity of businessmen and traders throughout the world. For despite a tradition of Soviet self-sufficiency, the Kremlin now appears to be encouraging expansion of trade—with Europe, the Americas, Africa, and Asia.

The Russians have talked boldly of increased trade before. But this time it may be something more than talk. Look at a recent analysis of 1957 trade figures:

—**The U. S. S. R.'s total trade jumped 13%,** to an estimated $8,250-million, the largest percentage gain since World War II.

—**Some 28% to 32% of total trade** was with nations outside the Communist bloc.

—**There was an absolute increase of almost 40%** in the Soviet Union's non-Communist commerce, according to estimates. And while the bulk of Russian trade remains with the Chinese-East Europe area, the percentage of such "ruble bloc" trade declined last year.

All this has set the stage for Premier Khrushchev's glowing promises for 1958—carefully planted among businessmen acutely worried about a recession in world trade. He is carefully cultivating trade pacts with Latin American and Asian raw-material producers. He is telling Europeans of profitable markets that lie to the East. He is creating a stir in London with increased sales of Soviet metals.

Little wonder businessmen everywhere are asking themselves: What does it all mean?

It probably does not mean that Russia and its satellites are about to become a significant, major factor in world commerce—for all the talk and trade statistics. Most trade experts doubt that it is the Kremlin's political intention. Nor do they see the economic basis—in terms of either capacity or need—for a greatly-increased Soviet role in trade.

This is not to say that Soviet bloc trade with non-Communist nations will not increase; indeed, a 10% increase is expected this year. But even that will not bulk large in world business. Even last year's Soviet bloc exports amounted to no more than 2½% of the total non-Communist exports.

No doubt, either, that Russian leaders want to have a place in Western markets. They believe trade gives them political respectability, political "leverage," in non-Communist lands. And they are convinced that, having attained a large degree of self-sufficiency, they are in a good position to regulate trade to fit political ends.

It is relatively easy to buy and sell what seems advantageous politically at any given time, without much regard for the consequences of supply and demand. To suit its purposes, Russia can go without many imported goods; or it can absorb large quantities of them. And it is often a question, say Western economists, of "let the seller beware." They recall Burma's rice deal with Russia—where Moscow bought a large quantity, then re-exported it at cut prices, to the horror of the Burmese.

There are limits to political trading. But measuring the limits is practically impossible. For example: Russia's recent sales of aluminum in London have been called an indication of Soviet surpluses, partly caused by reduced aircraft production. Yet Russia's civilian market for aluminum consumer goods is virtually untapped.

Once you allow for totalitarian flexibility, Russian trade motives—with the aluminum perhaps—may still have economic overtones. One theory is that the Russians would like to lower the prices of materials they are under obligation to buy from East Europe. More likely, it is simply a matter of earning the exchange to buy those non-Communist goods they want to have.

Few economists believe that Moscow is out to break any markets. Unquestionably it could put severe pressure on prices. But this would earn less foreign exchange, and more enmity from raw-mate-

rial producers whose confidence Kremlin leaders want to win.

As to import needs, Russia continues to look for special machinery and equipment (certain machine tools, ships, etc.) and commodities such as steel, rubber, sugar—for which it usually offers other raw materials or sells gold.

Traditionally, Russia buys sporadically, according to an immediate need, then decides what can most profitably be sold in exchange. And as yet there is little indication that this behavior pattern is shifting markedly. Nor is it likely that the autarkic nature of ruble bloc trade will change. The U. S. S. R. has recently signed binding new bilateral trade agreements with East Europe, and is working on one with Peking. So last year's dip in intra-bloc trade may be only temporary.

Furthermore, some observers predict that Russian production of consumer goods, lagging way behind heavy industrial equipment, may begin to pick up. This, they believe, will tend to restrict rather than increase outside trade.

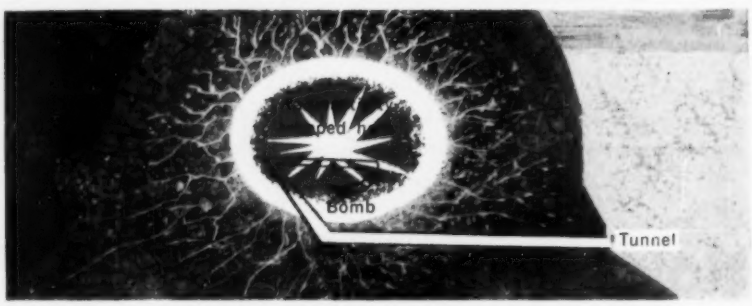
This idea has been encouraged by the Russians' apparent interest in consumer goods production machinery; they talk constantly of buying a rayon plant, food processing units, and so on. But rarely is there much interest in the finished goods themselves. Buy a prototype plant or unit, Moscow seems to say, and have our engineers copy it.

The experience of a British manufacturer of an expensive specialized machine is revealing. In the past year, important Russian visitors have praised the machine, talked of orders "by the hundreds." Later, Moscow asked for specifications and prices. These were sent. Then the order came back—for two machines. The English firm refused the business, sure that the Russians meant only to copy.

Though they have been a larger market than Russia, East Europeans (who bought $1,428-million worth of goods outside the Communist bloc in 1957) are generally guided by many of the same factors. Politics dominates trade. This is true to a lesser extent in Poland, which is operating more flexibly and obviously wants to expand its non-Communist business. But at the same time, the new trade agreements call for a substantial increase in Russian trade over the next few years.

Another limit on East-West trade has been the strategic goods embargo, now under review by the North Atlantic Treaty Organization in Paris. There is considerable pressure from NATO members and Japan for a relaxation of controls—and such a relaxation is likely later this year. Yet the impact on trade will not be very great—for the simple reason that the embargo list has already been cut down almost to its core of obviously military items. ●

Promise in a Buried Bomb



This explosion, deep inside a desert mesa, may open wide uses for nuclear bombs in petroleum, mining, earthmoving, research.

EFFORTS to harness atomic energy peacefully have centered primarily on its use as a power source. Now a new possibility: putting the direct explosive force of nuclear bombs to work for mankind.

A few weeks ago, the U. S. A.'s Atomic Energy Commission revealed it had set off a "small" atomic bomb (equal to 1,700 tons of TNT) inside a mountain. Note these two results of the blast:

—**Stone nearest the blast melted,** and soaked up most of the dangerous radioactive particles of the bomb. Confinement of the radioactivity, AEC believes, virtually eliminates the physical hazard.

—**The intense heat of the blast was also penned up** inside the mountain. Three and a half months after the test, rocks with a normal temperature of 17 C still were heated to as much as 88 C.

The test blast crushed some 400,000 tons of rock inside the mouhtain (and caused the top of the mountain to jump about 15 cm.). AEC officials suggest that such an explosion might be used to loosen up the formations around old oil wells, and permit more petroleum to flow to drill holes. Already, several petroleum companies have conferred with AEC about the possibilities.

One is that retained heat of the explosion might make oil more fluid, increasing recovery. Another thought: Use the heat to retort the oil in shale, thus liquefying it.

Meanwhile, mining engineers concede that atomic blasting might help them get at large ore deposits.

The possibilities are not confined solely to petroleum and mining. Blasts may well be used for:

—**Digging out harbors and canals.** Problem: Radiation hazards from earth thrown into the air.

—**Producing steam.** The recent test created very high temperatures. It should be possible to confine that heat in a mountain, pipe water to the hot area, and get steam for heating or power.

—**Produce radioisotopes.** With the isotopes confined in the molten rock, it would be fairly simple to remove them.

—**Induce chemical reactions.** A blast might gasify a coal vein.

—**Study the earth's structure.**

All these possibilities will require careful study, and AEC has set up a program called "Project Plowshare" to carry on the research. But it has no doubt that the peaceful bomb may become man's most powerful tool for rearranging the earth to suit his needs. (*Business Week, Mar 22, p27*) ●

conservative, a proud patriot and

Business + Government . . .

. . . do not always mix. But they must work together. Here is the story of Eugenio Mendoza, Venezuela's top businessman, who has become a statesman to help Admiral Larrazabal (at right) solve the nation's problems.

IT TAKES COURAGE for a businessman to accept a high post with a transition government—especially in time of stress, especially in Latin America. This is true even in Venezuela which, for all its petroleum wealth, faces stern problems as it attempts to build a democratic government in the vacuum left by a fallen dictator.

Yet many believe the problems will find reasonable solutions—largely because government is in the hands of reasonable men. Prominent among them, and certainly most prominent in economic matters, is Eugenio Mendoza, Venezuela's leading businessman.

Broad-shouldered and vigorous at 51, Don Eugenio (cover picture, and above) is at the peak of a career that could—possibly—carry him to the Presidency. Already his presence on the junta has helped bring able business and professional men to the new government.

Yet Mendoza is wholly a man of affairs, a creator and manager of businesses, and not a politician. The army, accustomed to running Venezuela, will be a force to reckon with for years. Political parties have in the past been irresponsible. No civilian president has ever finished out a constitutional term.

Clearly, the role of the businessman in politics—in Venezuela as in many other nations—is not an easy one.

I. Business Builder

Mendoza's career is a business career, beginning as an office boy at 18. His father was a man of comfortable means, yet Eugenio shunned the University and went to work with a textile firm after finishing *colegio*. But he is neither "self-made" nor "self-taught" as some popular legends would have it. His education was a good one, and he was well connected with Caracas' leading families.

In 1926, Mendoza joined a construction materials firm as a partner. The petroleum boom was on, business was good. In 1931, Mendoza was able to buy out the firm.

Later, the firm evolved into Materiales Mendoza, whose big double-M sign is now a familiar sight in Venezuela. Together with Maquinarias Mendoza, formed in 1948, it holds distributorships for a variety of foreign products.

In 1938, Mendoza made the first of a series of expansions into related businesses. The first was a concrete block plant.

From the beginning, Mendoza adopted a progressive labor policy of incentives—unheard-of in the days of the tyrant Juan Vincente Gomez, who would tolerate no labor unions. When the first labor law was decreed, Mendoza employees were already collecting benefits far beyond the legal requirements. Last year, some pocketed profit shares equal to 11 months' wages.

During World War II, Mendoza moved into a new field—animal feed. And after the war, Mendoza rode the nation's tremendous construction boom that has continued to this day. He set up sand and gravel companies, several cement plants. Later, in 1952, came a paint factory, and at the same time a paper and Cellophane bag company, in participation with the U.S.A.'s Continental Can Co. In 1954, Mendoza formed a paper and pulp company that this year will complete a $15-million plant.

The latest venture is Financiera Mendoza, an investment trust designed to finance new industry. Mendoza put in shares of several of his companies; the rest of the capital was oversubscribed in a public offering.

The organization and financial resources of Mendoza enterprises have made them an attractive prospect for a number of individual and institutional investors in the U.S.A. and Europe. But in all cases, Mendoza keeps firm control.

II. Philanthropy & Politics

In a quarter century, Mendoza has built up personal assets of some $25-million—not one of Latin America's biggest fortunes, but one of the relatively few acquired through trade and industry rather than real estate, mining, or cattle. He has put that money to work as Venezuela's only large-scale philanthropist.

There is a Mendoza Foundation, spending its money on aid to children (its Children's Hospital is one of the best-equipped anywhere), improvement of agriculture (like most Latin Americans, Don Eugenio loves the land, and his 480-hectare hacienda), cultural activities. Now, the foundation has been called on for technical assistance in a rural housing program undertaken by government.

In philanthropy and in business, outside observers agree that Mendoza's success is the result of a talent for organization and personnel policy. His organization is set up to carefully screen proposals, carry out exhaustive production and market research. The 3,000 employees are well-paid and loyal; the managerial group represents a big asset—and a big investment. Mendoza picks managers with care, gives them a share of the business—and delegates authority.

Mendoza has a tenacious mind: His friends call him *"testarudo"*—literally, hard-headed. He reacts fast, is a hard bargainer, and is sensitive to criticism he regards as unfair. Currently he is working a 14-hour day, living in eastern Caracas with his wife and small son (two daughters are in school in the U.S.A.).

Progressive in business, Mendoza is politically a "middle-road"

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conservative, a proud patriot and nationalist. But he is a practical nationalist, always seeking to reconcile opposing interests.

When the possibility of U. S. restrictions on Venezuelan oil first threatened several years ago, Mendoza dropped his private concerns, rounded up other prominent businessmen, and headed north to argue Venezuela's case. The group covered 25 cities, talked day and night to business groups—and was credited with helping to defeat important curbs. This year, it was Mendoza who met with a U. S. business group to work out details of another campaign against oil restrictions.

Mendoza is not new to formal government effort, either. In 1941 he was appointed head of the Ministry of Development, which then handled petroleum affairs. He was involved with the negotiations for the revolutionary 50-50 share of the profits agreement with foreign oil companies.

A year later, Mendoza resigned —under a cloud. His companies had received a large share of wartime import permits, and enemies charged favoritism. Mendoza replied that he had no part in the issuance of permits. And in any case, outsiders agree his companies were the biggest prewar materials importers, entitled to their proportionate share of permits.

The problem—"conflict of interest"—is just one that plagues the businessman in government. There may be many more as the government of Admiral Wolfgang Larrazabal attacks the problems inherited from former *caudillo* Marcos Perez Jimenez.

Not the least of them is preparing for a democratic election. Mendoza has long been considered a possible presidential candidate. Now that political leaders are preaching moderation and a united front of civilians, Mendoza's name comes up often.

Venezuela's political parties have not yet made up their minds about forming a coalition and backing a single presidential candidate. If they do, and can agree, Mendoza seems a good prospect, commanding respect at home and overseas as a moderate, a friend of the workers, a philanthropist, a "defender of Venezuelan interests." ●

● REPORT TO MANAGEMENT

SOLIDARITY SYMBOL marks a renewed effort by the international labor movement to promote trade unionism around the world.

FORMIDABLE OBSTACLES are the touchy political issues, labor's own weaknesses, Communist infiltration. For management, the basic question is:

International Labor: Friend or Foe?

SOLIDARITY is a nostalgic slogan in the trade union movement. With the "S" above, labor solidarity takes on a new meaning.

The "S" stands for a special Solidarity Fund now being raised by the International Confederation of Free Trade Unions to promote trade unionism in the less-developed countries of the world, and, in the ICFTU's own words, "to provide assistance to workers who fall victim to repressive measures from Communist, Fascist, and colonial regimes and from hostile governments and employers."

The goal is $5½-million, and over half has already been pledged by the British Trades Union Council, the U.S.A.'s giant AFL-CIO, and the German DNB.

Such fund raising is news of importance to business executives everywhere. Whether in unionized or non-unionized businesses, whether sympathetic or antagonistic to organized labor, management cannot afford to ignore what is happening in the labor movement. And, today, as never before, there is an organized world movement of trade unionism dedicated not only to better wages and working conditions, but to making itself a force in world economics and politics.

One thing is sure: If management must negotiate with a union, management has a paramount interest in the kind of union it will be. And it is to ICFTU's credit that it wants to encourage "constructive," well-managed unions. This confederation now has 134 affiliates with 56-million members in some 94 nations and territories. It has world headquarters in Brussels, semi-autonomous regional organizations in Europe, the Americas, Asia, and is setting up one for Africa. And it is ambitiously "on the march."

I. Fighting the Communists

The ICFTU was formed in 1949 by anti-Communist labor leaders who broke away from the World Federation of Trade Unions (organized in 1945). Make no mistake on one point: When the ICFTU leaders talk about fighting communism, they are deadly serious.

The WFTU, now completely Communist-controlled, claims a membership of 92-million, but it is estimated that at least 87-million work in Communist countries, with the remainder largely concentrated in France, Italy, and Indonesia. As an organization of trade unions, the WFTU has been pushed behind the Iron Curtain.

At its Fourth World Congress last fall in Leipzig, the WFTU set up a new press and propaganda committee (headed by a Russian), called for a variety of special conferences of workers, and adopted resolutions on "peace."

Despite this activity, observers say that Moscow has virtually abandoned the WFTU as its vehicle to influence the trade union movement. Some believe that the Communists are now concentrating on infiltrating unions affiliated with the ICFTU.

ICFTU affiliates have shown spectacular growth in the past few years, especially in places like Malaya, Indonesia, and North Africa. But in the opinion of many observers, the influence of the ICFTU has not increased in proportion to the increase in its affiliated membership.

One veteran unionist—judging the ICFTU solely in terms of the non-Communists vs. the Communists—sums up the present situation this way:

"In the Middle East, very little headway is being made. In the Far East, ground is being lost to Communist groups. In North Africa, because of the Algerian situation, Arab trade unions are climbing on the fence, waiting to see which side intends to help most. In Latin America, regional organizations are going through a series of internal conflicts, and the labor leaders are too naive or preoccupied to see the dangers of Communist encroachment."

In the light of this judgment, the Solidarity Fund—and the organizing effort it will finance—takes on a new meaning, and it could be the spark that rejuvenates the ICFTU. The Fund also has another meaning: the rich and powerful European and U.S. federations have expressed support and confidence in ICFTU—something that has not always been forthcoming, from the U.S. unions in particular.

II. Powerful Support

Today's international labor movement gains its strength from

LABOR'S "PARLIAMENT", meeting in Tunis, voted to raise Solidarity Fund to help foster free trade unionism around the world. Resolutions on political issues were sharply "anti-colonial", "anti-totalitarian" and anti-Communist.

the established position of labor in the industrial nations. In most of these nations, union-management relations have been amazingly peaceful for years. There have been strikes, to be sure. But, by and large, they have been quickly settled. Wages have risen, working hours reduced. And labor leaders have become mature; many have become statesmen.

Indeed, as respected statesmen, some labor leaders may have lost much of the dynamism and zeal that marked their early days of battling employers and governments.

But they are often highly effective as statesmen. The new President of the European Coal and Steel Community's High Authority is a life-time trade unionist. He is Paul Finet, past general secretary of the Belgium FGTB and first president of the ICFTU.

"Everybody knows my history and where I come from," comments Finet. "I shall still be faithful to my life's ideal . . . and this is not in the least in conflict with the duties of President."

The High Authority, among other things, has spent $60-million on workers' housing and instituted a labor passport for coal and steel workers. And the ICFTU affiliate unions in Europe have a secretary in permanent liaison with the Coal and Steel Community.

It is generally agreed that the European Common Market could never come into being without the cooperation and support of labor. And such international political and economic agreements greatly increase the importance of organizations like the ICFTU—which recently formed a committee (headed by Robert Bothereau, General Secretary of the French Force Ouvriere) to look after workers' interests in the Common Market.

The unions are pressing for representation on the Community Commission and on the board of the European Investment Bank. This sort of activity seems a long way from the simple slogan of "Bread, Peace, Freedom," which had great appeal in Europe in early days, and has great appeal in poorer, less-developed lands now.

The leaders of international labor tend to be European. With a few notable exceptions, U.S. labor men seem reluctant to leave home. The European tradition is to pay union leaders no more than the highest-paid member of the union. In sharp contrast, U.S. labor leaders are often paid on a management scale (John L. Lewis, President of the United Mine Workers, makes a presidential $50,000 a year). Yet some dedicated unionists say that labor leaders—including the Europeans— are becoming "fat and happy" with bigger salaries and perquisites.

But the Europeans, though perhaps losing some of their revolutionary zeal, are also becoming less doctrinaire, more practical in approach. The younger leaders have almost ceased to pay even "lip service" to the old Marxist slogans. Even public ownership has lost much of its appeal in recent years.

III. A Maze of Initials

The ICFTU, of course, is only one of dozens of labor organizations with "international" in their names. It is easy to get lost in the maze of initials — the THEIUHRBW, for instance, should not be confused with the TUIWFTHCT or the IFCUWFDTHT. Most "internationals" are national unions or federations within a trade.

It takes only a slip of the typewriter, however, to confuse the ICFTU with the International Federation of Christian Trade Unions. For that reason, the Christian international organization is generally referred to by its French initials, CISC. The CISC has aspirations to become more influential world-wide; its main strength is in the European low countries. One deterrent: the ICFTU tends to ignore the CISC.

The International Labor Organization (ILO) is an affiliate of the United Nations, and dates back to the League of Nations days. It is a tripartite body with representatives of labor, management, and governments. The ILO has adopted over 100 "international conventions." But, usually, the only governments that ratify the conventions are those that already observe them; at any rate, there is no provision for inspection or enforcement.

Since 1954, when Russia and other Communist countries joined, the ILO has become mostly a political forum in the Cold War. Management spokesmen for free enterprise are clearly outnumbered, and even labor leaders—many of whom are also active in ICFTU—have lost faith in the ILO as an effective organization.

IV. Up and Coming ITS's

Another common initial is ITS. This refers to the international trade secretariats set up by many of the international federations (there are some 23 ITS's) affiliated with the ICFTU.

These secretariats are basically more important in the day-to-day activities of unionism: They are the "stomach" of international la-

bor, the ICFTU is more of a "voice." When, say, the dockworkers in Naples have a problem, the man likely to give the most help is a "specialist" from the transport workers' secretariat, not a "generalist" from the ICFTU.

Though there is some bickering over the proper function of each, these secretariats work in close liaison with the ICFTU. As a matter of fact, the man sent to help the Naples dockworkers might well be an ITS specialist flying ICFTU colors.

For the most part, the secretariats stay out of politics. But it was the ITS leaders who broke with the Communists and killed the WFTU long before the ICFTU was actually formed.

An ITS develops in two stages. First, there is an information stage, with much traveling, communications, and the publishing of reports and pamphlets. Later, the ITS reaches the "how can we help?" stage—with a budget big enough to provide help.

At present, the only two secretariats that are considered to have really reached the second stage are the transport workers (7.5-million members) and the metal workers (8.2-million members).

The transport workers have a natural international interest—railroads, airlines, ships. The metal workers have become strong through diversification—they include not only metal processing and steel mill workers, but also automobile workers and mechanics, electrical and appliance-plant workers, shipbuilders, and even blacksmiths.

There are probably a half-dozen other ITS's now struggling to pass from the information level to the level of effective cooperation.

V. How Much Solidarity?

The effectiveness of international labor is diminished by internal dissension. The secretariats are supposed to follow general ICFTU policy. But at least two federations have accepted Yugoslav affiliates (the Miners, the Building & Woodworkers) and this "forbidden" action has caused friction between unions and with the ICFTU.

Should the plantation workers of the world have their own ITS, or should there be just one secretariat for the plantation workers, food and beverage workers, and landworkers? Such apparently minor problems can create a bitterness that is seldom surpassed in labor-management relations.

It is difficult to assess the strength of international labor. The ICFTU makes most of the news, and businessmen around the world will be meeting it more frequently as its Solidarity Fund program gets underway. Supporters tend to overrate the ICFTU; critics tend to underrate its accomplishments.

Actually, the ICFTU has never claimed to be a prime moving force in international labor. It has never tried to set up a union with its own funds, or to develop union dependencies. "We have never bought anybody," exclaims General Secretary Oldenbroek (see below).

The ICFTU is, after all, a sort of "umbrella" organization, and is no stronger than its spokes. Primarily, it supplies advisors, provides verbal and moral support, and contributes or lends small sums to fledgling unions.

ICFTU's regional organizations are semi-autonomous. The strongest unit is the ORIT grouping of South and North American unions, with headquarters in Mexico City. Only recently, however, ORIT's Secretary General resigned, and ORIT is now under a caretaker committee. And there are reports of continuing friction between Brussels and the regional organization.

The regional organizations carry on training programs, organization drives, and propaganda. ORIT, for instance, has a special five-year plan for Brazil, Argentina, Chile, and Uruguay, with an

Spokesman for Free Trade Unionism

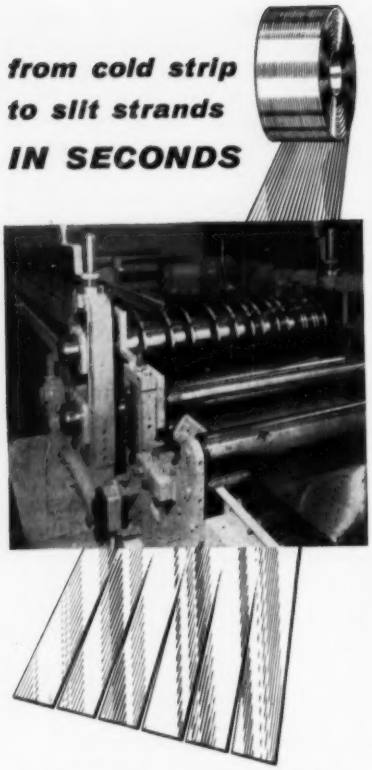
J. H. OLDENBROEK (above), Secretary General of the International Confederation of Free Trade Unions, is perhaps the world's most important spokesman for international labor. He directs the ICFTU's battle against what it considers the barriers to free unionism—colonialism, communism, dictatorship, and discriminations—and he is a man to watch in ICFTU's expanding activities.

Oldenbroek oversees a headquarters staff of 80 in Brussels, and an almost equal staff in the field. Information on union problems, labor incidents, political activities, and requests for funds pour into the Brussels "intelligence" center; reports, telegrams, and missions pour out. Oldenbroek also spends much of his time attending conferences, congresses, and committee meetings—and trying to mediate the ticklish internal disagreements that keep the corpus of international labor squirming like an amoeba.

Oldenbroek's political activities are easily the most controversial part of his job. For a spokesman of an unparliamentary body, his voice carries a lot of influence. Many governments, including friendly ones, would prefer him to stick closer to basic labor problems. Supporters of Oldenbroek have this to say: "To his credit, he has kept his interventions in world politics to questions involving the rights of workers and trade unionists."

Oldenbroek, now 61 years old, has been doing international work for 40 years. He joined the Dutch Transportworkers Federation when he was 18, became secretary of the transport International before he was 21. In the tradition of European labor, Oldenbroek works for a modest salary (probably about $8,500), bolstered by perquisites.

from cold strip to slit strands IN SECONDS



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extra $40,000 yearly budgeted especially for new organizing and training. ORIT selects and pays organizers, and provides lecturers for trade union courses in industrial centers.

In Asia, the ARO training school in Calcutta puts 250 to 300 unionists a year through a 12-week course. Shorter courses are held in such places as Dacca, Pakistan; Bangkok, Thailand; Hitachi City, Japan. One of ICFTU's main problems is the general suspicion of Western advisors in the nationalist atmosphere of Asia.

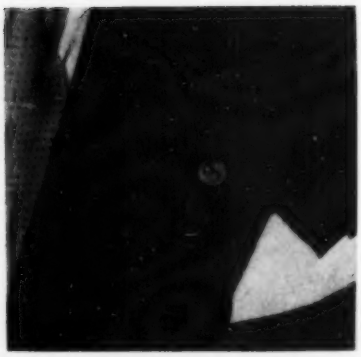
In its courses for unionists, the ICFTU teaches that the strike is a weapon of last resort, that a good union leader sticks to the bargaining table until the chances for a peaceful settlement are exhausted. It makes an effort to teach union leaders practical techniques, from how to be a local-union secretary to how to operate a mimeographing machine—though critics say that far too many ICFTU sessions are devoted to long-winded speeches on such omnibus topics as "The Role of Unionism in the World Today."

Meanwhile, ICFTU meetings are paying increased attention to economic problems such as raw material price supports, and economic development plans. And this interest is also showing itself on higher levels—most influentially among labor leaders with United Nations connections.

But despite this interest in broad economic matters, there is little doubt that ICFTU does try to promote "constructive" trade unions. Its area representatives are often a moderating influence in situations that might otherwise have gotten out of hand.

The ICFTU has an excellent intelligence network. Incidents, strikes, and issues are quickly reported to Brussels, and interested unionists notified. It can tap some powerful mechanisms of international labor cooperation. The owners of a phosphate mine in South America were strongly "encouraged" to recognize a mine workers' union—by the simple expedient of having U. S. dockworkers refuse to unload shipments of the company's phosphate.

International labor seldom resorts to such drastic methods of cooperation. But management is becoming aware that local labor leaders cast a long shadow.



"S" LAPEL BUTTON is used by British Trades Union Council to encourage pledges to ICFTU's Solidarity Fund.

VI. In the Political Arena

Politically, too, the ICFTU can be powerful. In North Africa, the ICFTU was active long before Tunisia and Morocco won their independence from France. Today, half a dozen Tunisian cabinet members have union connections; one worked in ICFTU headquarters for three years, another taught ICFTU courses in Tunisia. The Moroccan affiliate has grown from 25,000 to 600,000 since independence. And in Algeria, the ICFTU is trying to repeat the pattern—with the General Union of Algerian Workers.

Strong support for "self determination" is one way the ICFTU believes it can fight neutralism and "fence sitting." It sponsors its own Afro-Asian conferences that are "anti-colonial" enough for all but the most vehement nationalist. And it puts out a stream of protests against dictatorships, Communist repressions, and such things as the French detention of Algerian labor leaders or racial discrimination in South Africa.

The ICFTU is often criticized for paying too much attention to political problems, not enough to the simple organizing and bargaining problems of local unionists. But ICFTU believes that one of labor's major problems is political, especially in lands where free trade unionism is suppressed, or where there is serious Communist competition. In such areas, "wages and hours" unionism has a hard time against the slogans, the wild promises, and demagoguery of Communist labor leaders. ●

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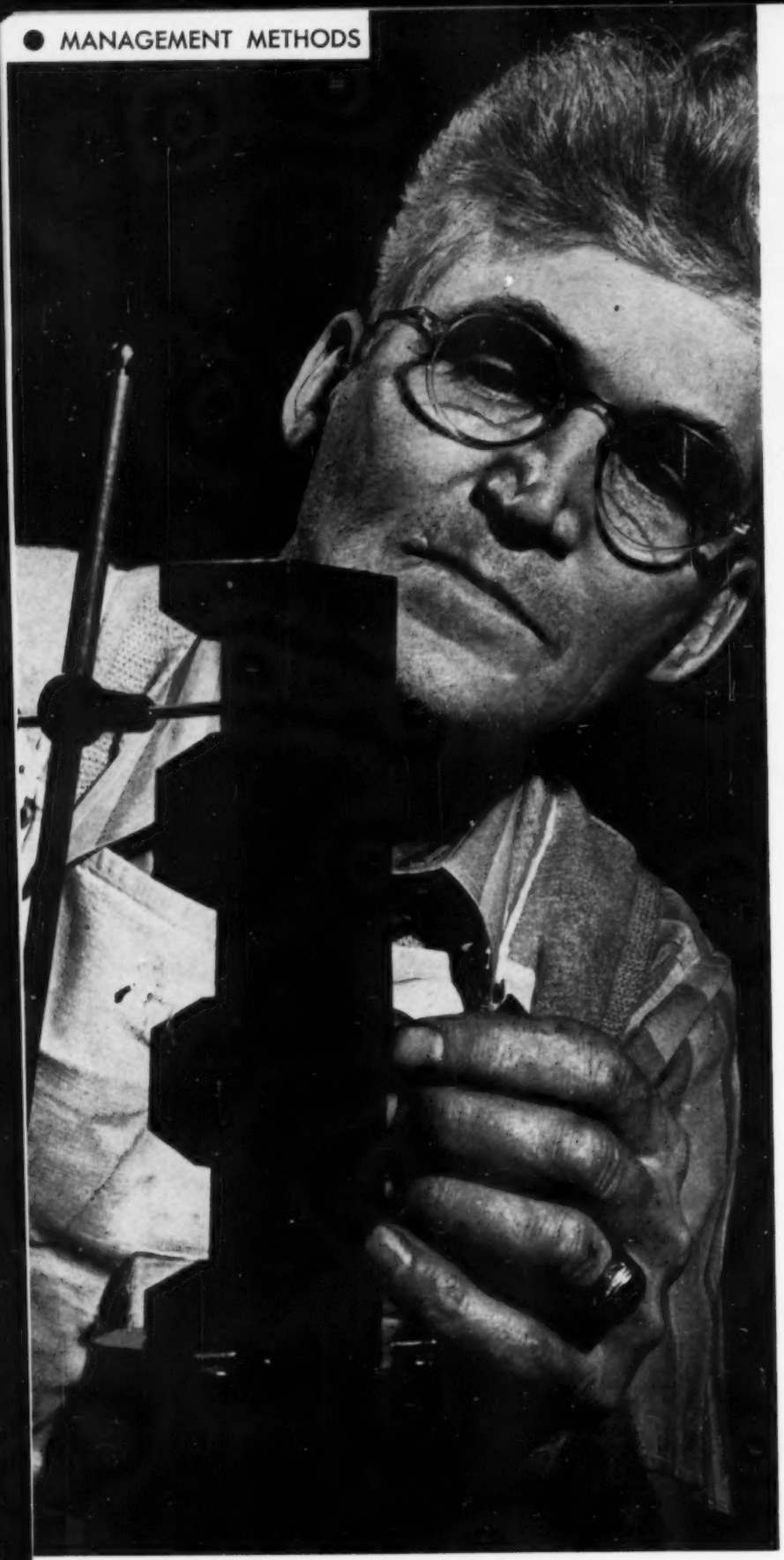


How Industry

Experience and loyalty are his outstanding assets. But he presents problems in hiring, transferring, and retiring.

THE OLDER WORKER presents problems for management, as every manager knows. And these problems are becoming ever more acute as populations grow older—as they are doing everywhere.

Executive thinking and action on the problem is often hampered by restrictive government regulations and trade union agreements: In many nations, you simply cannot fire an older employee. But there is also evidence that managers and supervisors too often resist the responsibility of trying to make effective use of older workers that they must keep.

Other things (education, training, etc.) being equal, older men and women stand out for attention to their jobs, loyalty to their company, and maturity of their skills. While they are regarded as resistant to change and hard to retrain for new jobs, they give an excellent account of themselves after retraining.

These are major conclusions from a survey of hourly-rated, aging workers in 163 manufacturing companies by *Factory* magazine and the Retirement Council Inc. The Retirement Council is an American service and consulting organization of business men, consultants, and social scientists. It conducts seminars on the problems of retirement, conducts research projects, and publishes a monthly news service called "Retirement Planning News."

After analysing the survey findings, the Retirement Council experts noted that management could do three things to make better use of older workers:

—**Do a better job of counseling** as workers approach maturity.

—**Study the attitudes** of older workers, their thinking about their company and their jobs.

—**Train supervisors** to deal with older workers more effectively.

Sees the Older Worker

The survey indicates that American management men generally have high regard for the aging worker's over-all performance, attitude, dependability, attendance. It also points up the areas where the older worker can be faulted—longer duration of illness, harder adjustment to change, slower response to training.

On one problem—"how old is old"—there is little agreement. *Factory* arbitrarily picked age 50. Of the companies surveyed, 64% reported no yardstick for age except years: on the average, they draw the line at 56. Many companies judge a worker to be "older" only when he can no longer perform required work or meet production standards. Personnel executives indicated they need help on this problem.

A Retirement Council expert comments: "Some over-56 persons may be physiologically younger than many 40-year-olds, while others may be ready for premature retirement for medical reasons. From the standpoint of policy and planning, a person could be considered 'older' at least as early as age 45, and preferably as early as age 40."

In hiring, placing, and promoting older workers, most managements say they have no restrictive hiring policy as to age. But, in practice, there seems to be an unwritten negative policy that, in effect, discriminates against the older applicant.

One company had this to say about the placement problem: "Our supervisors select all their people, hence feel responsible for their effectiveness. When a physical problem like age forces a man on a supervisor, the supervisor does not feel responsible for that person. This leads to lax supervision and weakens supervisory standards."

A reason for discrimination in hiring, according to a Retirement Councilor: "In almost any large company, where promotion from within is the normal and desirable practice, you almost never need to hire an older worker at the rate of pay his prior experience may have qualified him for. There is almost always a qualified employee ready and waiting for the promotion, so the real vacancy is again at the bottom starting rate."

The problem of company pensions is another roadblock. One expert estimates that an employer must maintain a fund of about $150 for every dollar per month of pension benefits (assuming the fund earns 3% interest). For each anticipated dollar of pension, an employer must put aside about $28.26 a year for a man hired at age 60; $8.04 per year for a man hired at 50; $4.11 for a man at 40; and only $2 per year for the youngster aged 20.

Very few of the companies set age ceilings to limit promotions. About 95% have no age limit for promoting people in hourly rated jobs. And 92% set no limit for promoting people to supervisory jobs.

Only one-fourth of the companies report any special personnel procedures for handling older workers. They do not make concessions on hours or working conditions or concentrate the older workers in special departments. But a majority try to shift older workers to easier or more suitable jobs. Resistance to change is reported one of the older worker's weakest points.

But much of the older worker's habits and reactions depends on the particular company, and how management handles the situation. As viewed by the Retirement Council: "If an organization has been 'change minded,' so that changes have been made frequently and people have been accustomed to changes in operation . . . older workers will accommodate themselves . . . about as well as others do.

"Tell them about changes well ahead of time. Explain how it will affect them so that they have nothing to fear . . . in this way you can overcome most of the apprehension and thus reduce most of the resistance to change."

On production, there was general satisfaction with older workers. The experience of one utility company indicates that worker performance ratings (percentage of workers rated "very good" or "excellent," by age) rise to a peak at about 45, then drop off: workers over 50 perform about as well as workers under 35.

Comments a company official: "We have taken nearly all the back-breaking work out of most of our jobs so a man can push a button, run a machine or drive a truck about as well when he is 60 as he can when he is much younger."

According to one Retirement Councilor, the older worker is "generally less inclined to respond to individual job-rated incentives and more inclined to respond to teamwork pressures—and this is increasingly a teamwork production age."

Seven out of 10 of the companies have a pension plan for hourly paid workers, and two-thirds have a fixed age for retirement. By and large, 10 years or more of service is required for eligibility—though almost 20% require less then five years.

Nine out of ten do not provide part-time rehiring of retired workers, but about a third say they will help retired people find employment elsewhere when requested to do so.

Almost half of the companies provide some sort of pre-retirement counselling, and about half keep in touch with retired workers through house-organ newspapers, annual affairs, birthday cards, etc.

Retirement Council: "Pre-retirement counseling needs to be more aggressive. The older workers who need the most assistance will be the last to come in and ask for it. Group counseling has certain advantages because the shy individual can often learn, without even asking questions.

"First he needs to understand that you don't have to be some kind of exceptional person to successfully retire. The second requirement is a realistic plan. He needs much more than a hobby—retirement is a way of life. And no one can tell him what he should do. The essential thing is that he be exposed to the alternatives." ●

(Factory Management & Maintenance, March, p85)

Trimming Your Overhead Costs

- **Faint heart never won efficiency in a company, nor added one cent to the profits of a business.**
- **In bad times, even more than good, an aggressive, sustained campaign is needed.**

Digested from MANAGEMENT REVIEW, March, p14

WHEN THE WEATHER gets stormy, the captain trims his sails, battens down his hatches, and clears the decks of all loose and unneeded objects. The same precautions are essential for the manager of a business when the economic skies cloud up with uncertainty.

Skillful management of overhead costs is one of the most useful yet least exploited ways that a company has for protecting its profit status. This is true in normal times, every day of the year, but it becomes more urgent when production capacity has outskipped market demands. The current U. S. business recession, partially reflected in many other areas, suggests this urgency.

Overhead costs can be trimmed. A U. S. metalworking firm found this out during the business dip of 1954, when it was hit by a sharp decline in profits due to overcapacity in its industry. The firm launched a profit-conscious attack on overhead costs. It was not a disorderly, panic-driven retreat, but a serious evaluation of what activities were essential and how many people were needed for each operation. Overhead manpower was cut from 700 to 450. The company's sales today are 50% greater, but it still is operating with an overhead of less than 500 persons.

A chemical company two years ago was faced with the need for acquiring added office space due to expansion. Instead, management initiated a study "to determine if existing facilities and personnel are being employed to best advantage." The study showed the way to cut the firm's order-filling activities (paperwork and physical handling) by 50%.

These two companies were not unique in the opportunities offered to them, but they were unique in the effective action they took. Most firms periodically start some sort of economy drive, or create some staff unit for paring down high points of expense. Few of these plans effectively reduce overhead costs, or provide any basis for controlling them in the future.

Why Plans Fail

Why do most firms, like the two cited, wait until pressed by a profit squeeze before attacking excessive costs ? What blocks them from taking positive action? Many factors add to the impotency of their efforts—among them, reverence for budget items, lack of confidence in a cost-cutting program, failure to tackle it in a fundamental way.

A frequent sin of management is to regard income, cost, and expense goals as set figures. Budgets are guides, usually based on past performance. To assume that expense allocations represent money designed to be spent, as some firms do, defeats any effort to question these items. A key principle is to recognize the limitations of the budgetary process, and to take into account the individual prejudice that may have gone into setting up any of its items.

Allied with this is a lack of what might be termed "profit motivation" for those charged with overhead departments. On-the-line supervisors, and even many executives, often are not enthusiastically interested in seeing overhead expenses curbed.

With top executives, it is often a question of lack of faith in the value of any cost-cutting drive. Many can not appreciate the amount of savings involved—perhaps as much as 30% or 40% of existing expenditures. With no reliable measurements available, they have no clear picture of how much a worker can produce, nor of which overhead activities can be safely eliminated.

Also, most firms fail to approach overhead control in a positive, fundamental way. They are guilty of:

—The panicky, fire-fighting approach, which ends up in smothering a few unsightly expenses but with no continuing program.

—The forms-revision approach, which may whittle away at incidentals and leave the main problem unsolved.

—The mechanization approach, which presumes that the way to save overhead money is to get a machine to do a man's job.

A New Approach

With such inherent obstacles, management must gear itself for an enthusiastic, creative effort if it hopes to seriously control overhead costs. Top management must do two things: 1) Condition itself for a major change; 2) Sell the nature and value of this program to lower supervisory levels.

In conditioning itself, management must resolve that this will not be another half-hearted attempt, but a campaign for big savings. The effort will take time, and can not be achieved cheaply. Calculated business risks may be involved, and also a willingness to make brave decisions affecting people and traditional practices.

If the effort is to be successful, top management must not only wholeheartedly endorse the program. It must also show a willingness to assume responsibility for seeing that major results are attained.

Management then has the larger job of properly motivating down-the-line managers in behalf of the program. Here are four steps that can be of major help:

1. Set a specific goal for the amount of savings that are desired. This will divert attention from whether changes can be made,

to how the goal can best be achieved.

2. Convince down-the-line managers that this is their program, not the responsibility of any cost-reduction task force. They in turn must focus attention on how quickly and how well their subordinates can contribute to the overall savings goal.

3. Assure the supervisory force that all efforts will be made to see that no employee is hurt by the program. If a job is eliminated, the company will try to find an opening for the man in another department or affiliate.

4. Give real rewards and recognition to those who help in achieving the defined goals. This will give the program continuing vitality. Workers will judge whether management means what is says by the way in which it rewards good performance.

The Plan in Action

Creation of a vigorous, action-taking climate is half the battle. The other half depends on how resourceful and imaginative the personnel are who carry out the cost-cutting studies and remedies.

The first step is to re-evaluate the work that must be done. Challenge major activities before tackling individual operations. Consider whether the entire activity can be eliminated. If not, determine whether activity stages or volume of work can be safely reduced.

Take calculated risks. If the need for an activity or its profit-making value are uncertain, eliminate it—at least on a trial basis—and see what happens.

A related step will be to determine how all essential work should be done. This will mean analyzing what are the best manual or mechanical ways of performing each and every job.

Finally, by work-measurement techniques, find out how many people are needed to do the essential work. Indirect factors that affect the complexity of a job—such as company policy, the requirements of other departments—must be considered. But these indirect factors should not remain unchallenged, as they can be changed and may offer rich areas of savings. ●

In Management

License agreements are becoming more important . . .

. . . in international business, and more information is becoming available on this kind of venture. (See IMD Special Report, Dec., p19.) The U.S.A.'s National Industrial Conference Board has just published Part I of the most comprehensive study of licensing yet made.

The NICB study, restricted to U.S. participants, is based on a survey of 240 companies. The study describes licensing as "a middle approach to foreign markets—an alternate route somewhere between exporting and direct investment."

In the NICB study, 60% of the companies expressed satisfaction with their licensing experience—but still do not consider it positively the most effective way to develop foreign markets. Another 30% gave qualified approval, and 10% were forthrightly opposed.

The main objection was a reluctance to forego the full management control that goes with ownership. Others had misgivings about limited profit potentials, and about creating foreign competition.

Despite the reservations, some 60% of the group definitely plan to increase their licensing.

"Co-ordination Ltd." is the English equivalent . . .

. . . of a joint research, purchasing, and sales company set up by six Norwegian shipbuilding firms, on the recommendation of the Norwegian Productivity Institute. The Institute and the North Norway Fund contributed 72,000 kroner for market research, and the firms raised the total to 100,000 kroner ($14,000). Common inventory will be established, reducing stocks by half; and the firms will also "borrow" workers from each other. The goal, according to the European Productivity Agency, is to accept large cooperative orders.

"If I had to pick my successor right now," . . .

. . . a U.S. chemical plant manager told *Chemical Week*, "I'd give our maintenance supervisor serious consideration. We have already reached the stage where a good production manager has to be a good maintenance man. If he is not, he will find himself 'operating' a plant that isn't operating."

Chemical Week found that most chemical managers still think of production as the best route to the manager's jobs. But at least one firm has already broken with this tradition and is placing engineers with a maintenance background as plant managers. *Chemical Week* thinks it might become a trend.

Significant magazine articles are indexed . . .

. . . by title, subject, and code number at General Electric Co.'s U.S. headquarters and sent to key G-E managers in plant line and staff departments. A manager need only scan the index to find articles on subjects of interest to him. He orders them by code number, and the company library sends him a copy of the article reproduced by a thermo-copying machine. These copies need not be returned. (*Factory Management & Maintenance, March, p*133)

In a private war against the U. S. recession . . .

. . . the camera-making Bell & Howell Co. rushed new models to market as much as a year ahead of schedule, and at prices substantially below older models.

The company is counting on higher production and cheaper raw materials to lower unit costs to the new price level, reports the *Wall Street Journal.*

Executive salary increases are being frozen until year-end—when they will go into force retroactively if justified.

People Must Believe to Buy

Advertising must be believable to be successful. Here is how to make it more believable.

Digested from PRINTERS' INK, March 7, p56

ONE PROBLEM in making advertisements sell more goods is the problem of believability. Many marketing men fear that skepticism is growing as the advertising business itself comes in for criticism in many nations.

People are smarter than many advertising experts realize. The public is not easily fooled; and when it senses deception, it is not likely to act on an advertised suggestion.

Robert Collins, director of client relations of The Pulse, Inc., an American public opinion research firm, points out that his studies show a definite relationship between believable advertisements and sales.

Collins finds that suspicion of advertised claims is not limited to any one economic group. But he notices that whereas higher-income families are just bored or amused by unbelievable advertising, lower-income families tend to be bitter about it. People in the low-income brackets, Collins declares, can be alienated for life by just one unbelievable advertisement.

The degree of believability is greatly intensified among people who have been sold by advertising —but it may be negative as well as positive. Steady customers are most likely to believe your advertisements.

The Ad That Claims Too Much

The most frequently-cited reason for disbelieving advertising, in Collins' studies, turned out to be: "I used it, and it didn't do what the advertisement says it does." Over-stating a claim may lead to permanent loss of a customer.

In the perpetual search for ways to make advertising more believable, copy testing now plays an important role.

Horace Schwerin of Schwerin Research Corp. says that the believability of television commercials depends on the person who delivers the commercial message.

Schwerin found out, for example, that when the point of a cake mix advertisement was the ease with which it could be made, a housewife was more believable than a home economist or nutritionist as speaker. On the other hand, for an announcement that told about the chemical purity of ingredients, the nutritionist was more believable than the housewife.

The lesson to be learned apparently is that believability goes up as it becomes fitting for the individual to be talking about the claim.

The U.S.A.'s Fuller, Smith & Ross advertising agency pre-tests advertisements for believability.

By personal interview, researchers check up on the understandability, informativeness, interest, and importance that people are likely to accord to the advertisements when they are published. Believability comes up when the interviewers ask if there is anything difficult to believe in the advertisement—and how important specific product benefits are to the person.

By this method the agency found, for example, that some claims are not believed when the advertiser's name is blacked out, but are believed when a well-advertised brand name is visible.

The agency aims for a believability score of 90% by their standards. They find that an 80% score can be improved 10 or 12 percentage points by clearing up elements of confusion that readers indicate in the pre-tests.

Tests like these cost anywhere from $200 for a check-up on a few statements to $5,000 for tests of several advertisements. But when you can make an advertising campaign running to, say, $50,000 worth of space just 10% more effective, you have added $5,000 to your budget.

Surveys are another way of getting a blanket endorsement of a product. The results of a poll—especially one conducted by an independent organization that the public will recognize as impartial —are believable. A good sales record is also accepted as believable proof. This is the "Fifty million Frenchmen can't be wrong" psychology.

Seeing is Believing

Demonstration is the element that one researcher places at the top of his list of "belief factors." In print advertisements, this leads to use of large before-and-after illustrations that let the reader "see for himself"—and seeing is believing. Demonstration becomes particularly forceful, of course, when done live in front of the TV camera.

If laboratory tests are used, two other elements tend to strengthen belief: 1) controlled laboratory or proving ground; and 2) measurement of the product against some standard.

Money-back guarantees can often put believability into an advertisement that might seem unbelievable without it.

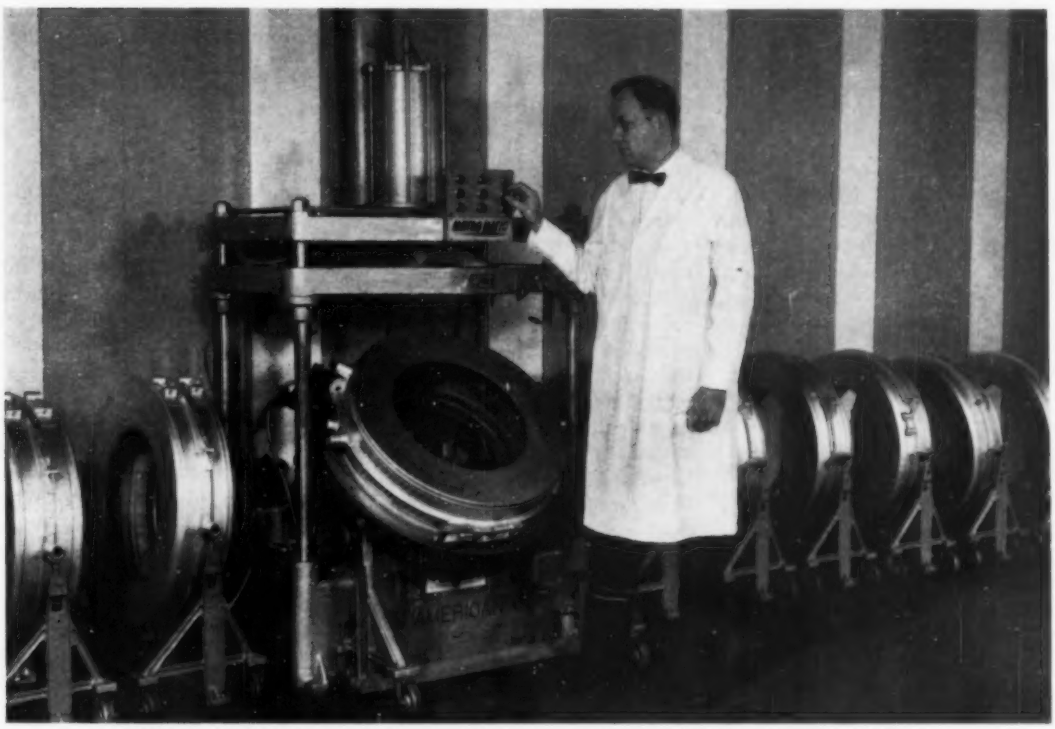
Be specific, and you will create greater belief. This applies to both copy and art. Photographs, for example, are more easily believed than drawings. Unrelated backgrounds can be damaging, too.

Believability's worst enemy is the unsubstantiated claim. Don't boast and brag unless you can make the claim completely believable. Unfinished comparatives (Our brand lasts longer, tastes better, costs less, etc.) are frequent offenders. If your advertisement is going to claim high quality and low price, be sure that you can prove this is true in a way that will be believed. ●

Most qualified producer of tire retreading equipment . . . .

BACON AMERICAN

The ever growing demand for tire retreading has opened important new business investment outlets for thousands of wise investors the world over. Retreading, following the present trend, will more than double its present healthy volume in five years . . . and Bacon American has engineered more tire retreading improvements in the last five years than were offered to the industry during the twenty years prior to 1953, to keep up with the trend.



MATRO/MATIC is the latest achievement for passenger tire retreading. All guesswork and hard labor are removed. Pushbutton control, space-saving, reduced overhead and perfect retreads are the most outstanding features.

Matrobands are used for truck top-capping. Simple to use, scientifically engineered, these truck bands put retread shops in the profitable top-capping business for the lowest possible investment.

All-Purpose Truck Molds have the patented exclusive "squeeze" principle which assures superior retreads. This is the only mold that can satisfactorily retread Michelin-type tire casings, a growing business everywhere.

SS Molds are for earth mover and other off-the-road tires. When the mold is open, a dining table and eight persons can be comfortably seated in the center. This equipment is the largest in the world.

MANY AREAS ARE STILL AVAILABLE FOR DISTRIBUTORS. WRITE:

BACON AMERICAN INTERNATIONAL

Dedicated to the Best in Retreading Equipment

1295 67th Street, Oakland 8, California
Cable Address: BACAM

☐ Please send distributor information.

☐ Please send equipment information, I am interested in developing a tire retreading shop.

☐ Other.

Name .....

Address .....

.....

Marketing is the Key . . .

. . . to economic development, according to Peter Drucker (left), a well-known U. S. economist and student of management. Below, he argues the "why" and the "how."

WHAT do we mean by "underdeveloped country"? The first answer, of course, is an area of low income.

But income is a result. It is a result, generally, of extreme agricultural overpopulation, and the result of low productivity. They combine in a vicious circle: not enough capital for investment, very low productivity of what is being invested.

All this we know and understand. But where does "marketing" fit in?

I. Marketing Is the Organizer

What we tend to forget is that the essential aspect of an "underdeveloped" economy is the inability to organize economic efforts and energies, to bring together resources, wants, and capacities, and so to convert a self-limiting static system into creative, self-generating organic growth.

Economic development is not a force of nature. It is the result of action — purposeful, responsible, risk-taking action of men as entrepreneurs and managers.

And this is where marketing comes in. Marketing is the least developed, the most backward part of the economic system in "underdeveloped" areas.

Yet marketing is the most systematized—and the most learnable and the most teachable—area of business management.

Marketing can convert latent demand into effective demand. It cannot, by itself, create purchasing power. But it can uncover and channel all the purchasing power that exists. It can, therefore, create rapidly the conditions for a much higher level of economic activity than existed before.

A marketing system creates small business. It is the only way a man of vision and daring can become a businessman and an entrepreneur himself. It is the only way in which a true middle class can develop.

Without marketing as the hinge on which to turn, economic development will almost have to take the totalitarian form. Economically, a totalitarian system is one in which development is attempted without marketing—indeed, as one in which marketing is suppressed. It is repressed precisely because it looks at the values and wants of the individual.

The need for marketing is often masked because "marketing" is often confused with the traditional "trader and merchant"—of which every one of the poorer countries has more than enough.

It is basic to understand the three functions of marketing:

—Crystallizing and directing demand for maximum productive effectiveness and efficiency.

—Guiding production purposefully toward maximum consumer satisfaction and maximum consumer value.

—Creating a "discrimination" value—rewarding those who really contribute excellence, and penalizing the monopolist, the slothful, or those who only want to take but do not want to contribute.

II. It Can Be Done

Consider the impact of the U.S.A.'s Sears, Roebuck & Co.—an operator of department stores—on Latin America.

To be sure, Mexico, Brazil, Cuba, Venezuela, Colombia, and Peru are not "underdeveloped" in the same sense that the Congo or Indonesia are underdeveloped.

At best, however, these Latin American countries are still "developing." And they face most of the problems of economic development that the countries of Asia and Africa are facing.

Sears Roebuck applies much the same policies and principles that govern it in the U.S.A., carries substantially the same merchandise (most of it Latin American-produced), and applies the same concepts of marketing. Thus the Sears story is, in a small way, a good example.

With only a handful of stores, handling only a fraction of the total retail business, this one American business has had a truly amazing impact.

Even as it builds one store in one city, Sears forces a revolution in retailing throughout the surrounding area. It forces other stores to modernize. It forces them to adopt consumer credit. It forces a different attitude toward the customer, toward the store clerk, toward the supplier, and toward the merchandise itself.

It forces other retailers to adopt new methods of pricing, of inventory control, of training, of window display.

The greatest impact, however, has been the multiplication of new industrial business—for which Sears creates the marketing channel. Because it had to sell goods made in these countries Sears has been instrumental in establishing literally hundreds of new manufacturers making goods which, a few years ago, could not be made in the country, let alone be sold in adequate quantity.

Simply to satisfy its own marketing needs, Sears has had to insist on standards of workmanship, quality, and delivery—that is, standards of production management, technical management, and the management of people. And in a few short years, Sears has helped advance the art and science of management of its suppliers by at least a generation. ●

Adapted from a speech by Mr. Drucker to the American Marketing Assn. in Philadelphia.

Financial Digest

It is not generally realized, but London's international insurance underwriting business earns some £40-million a year in foreign exchange for Britain. Now London's supremacy is being challenged by the local insurance companies that are expanding fast around the world—often aided by restrictive "favorite-son" legislation.

But insurance men see one big factor in London's favor, according to the Manchester Guardian Survey of Industry, Trade and Finance: the growth in size of today's international insurance risks: "the supertankers, giant airliners, oil refineries, power plants, and factories filled with equipment worth millions."

While businessmen will not always look as directly to London for risk protection, the risks and premiums will continue to find their way to London via the reinsurance route.

A typical case: the £100-million coverage of construction risks and public liability for the Indian steel mill being built in West Bengal by a British consortium. This coverage was far too great for the Indian insurance companies to handle—and the "lion's share" of the risk ended in London.

London is well-organized for such large scale underwriting. There is a vast pool of expert knowledge and experience, and big risks are spread out through hundreds of underwriters and insurance companies (there are 4,000 underwriters in Lloyd's syndicate alone).

On the other side of the protection field, life insurance ("assurance," generally used in Britain, is perhaps a better word) continues its international growth.

The U.S.A.'s Pan-American Insurance Co., for example, now has over a third of its $1,000-million insurance in force in Latin America. And it is making an important contribution to the development of local capital markets.

As a general policy, Pan-American has invested a proportionate part of its $200-million assets in Latin American nations where it operates. Branch managers handle the local investments in mortgages, loans, and bonds.

Endowment and retirement plans have been more popular than life insurance in Latin America, but there are signs that this is changing. And Pan-American is planning to introduce group accident and hospitalization insurance.

Insurance is also being used to help sell goods. The consumer credit subsidiary of Ford Werke AG. of Cologne, West Germany, is now offering prospective buyers protection against payments overdue because of unemployment, sickness, or death. The monthly premium for persons up to 50 is the equivalent of 3¢ for every $25 unpaid; over 50, the premium goes up. A Swiss firm, Vita Lebensversicherungs AG., is the underwriter.

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Real-estate syndicates made up of relatively small investors are on the increase in the U.S.A..

With pooled resources, the syndicates are buying or building office buildings, motels, shopping centers, apartment houses, undeveloped land. Returns are said to be much higher than from stocks and bonds.

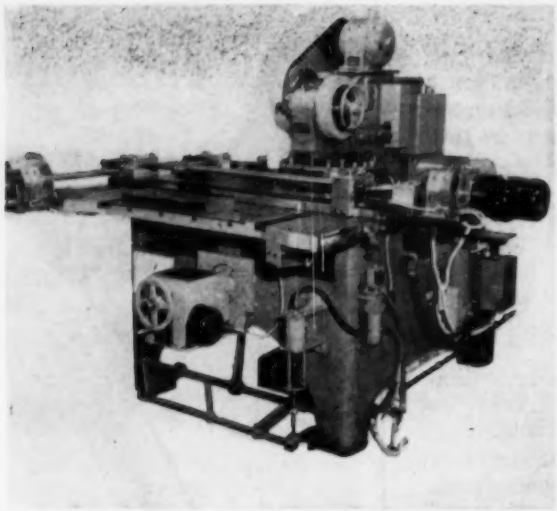
There is no one bolt that will meet all needs

...the same is true of air filters!

Bolts have *this* in common with air filters: there must be many different kinds to meet many different needs. That's why AAF (and *only* AAF) makes *all kinds* of air filters. Before you select *your* filters, make sure you talk with the company that *offers* a selection. We'd like to show you how our complete-line approach to clean-air needs benefits you—in *dollars* and *results*.

AAF

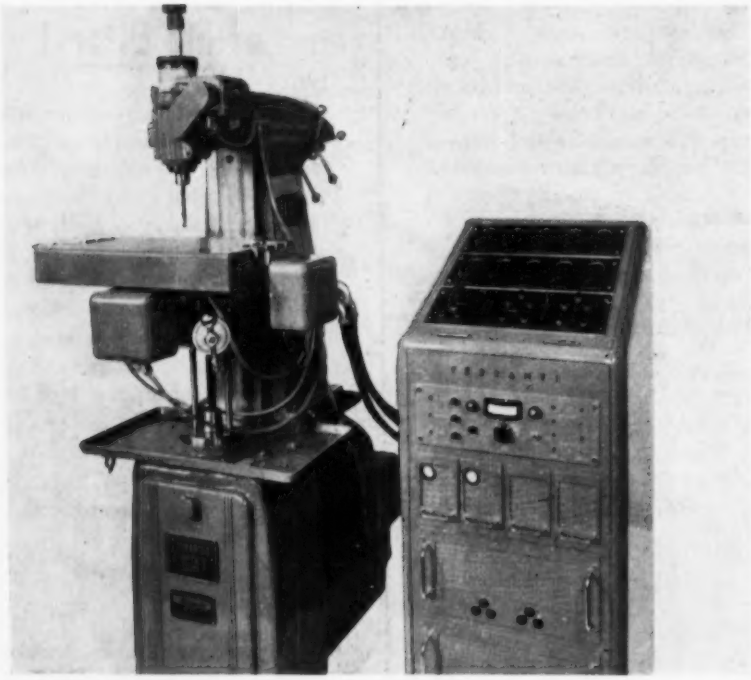
American Air Filter
COMPANY, INC.
215 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.
AIR FILTERS—ELECTRONIC PRECIPITATORS—ROTO-CLONES
Cable Address: AMFIL



EQUIPMENT: Two-axis control with turret selection. $4,100. MAKER: Fuji Tsushinki Mfg. Co., Japan.
FEATURES: Designed for use with Wiedemann turret punchpress (photo), but is adapted to other machines readily. Storage media: 6-channel cellulose acetate tape.

EQUIPMENT: Jig borer and positioning system, console. $65,000. MAKER: V. L. Schwartzkopff, Germany.
FEATURES: Price includes firm's borer (photo); over 70 units now in use. Employs special punch cards. With 14 cards, makes 28 two-axis machine settings.

Automated Tools Find a Place

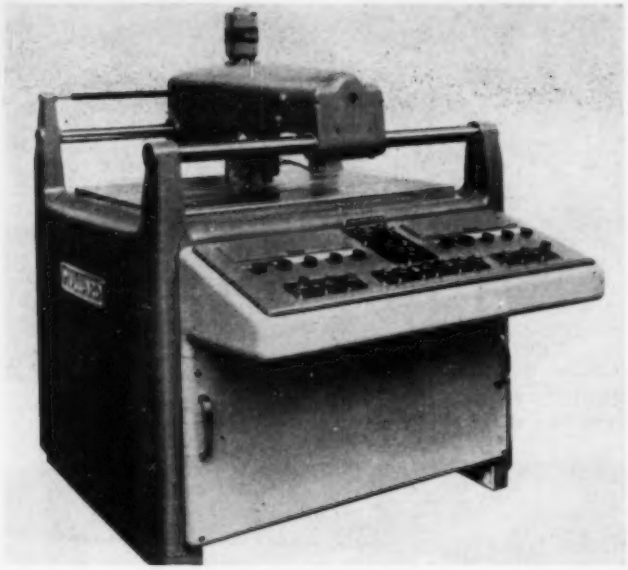


EQUIPMENT: Control system including measuring transducer. $6,000 ($3,000 per axis). MAKER: Ferranti, Ltd., U. K.
FEATURES: Has been used experimentally on a small drilling machine (photo), now being designed for 6-headed drilling machine. System is a by-product of the firm's development of a continuous contouring system.

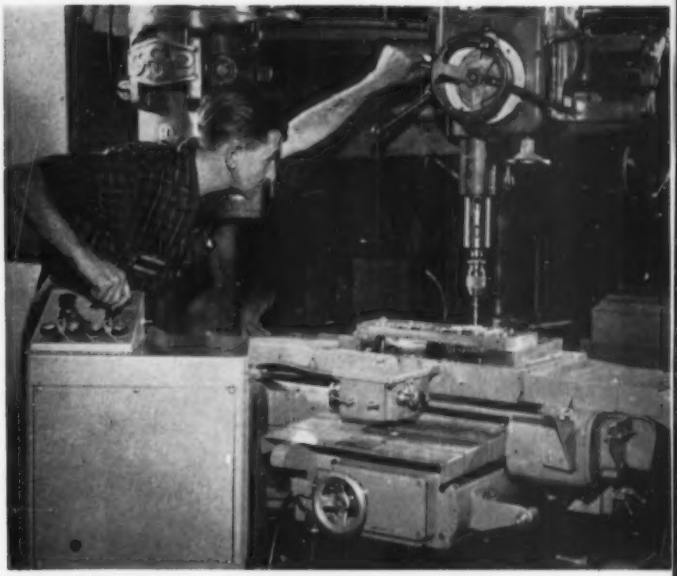
SLOWLY BUT SURELY, automation is moving into smaller metalworking plants. The proof: the six positioning systems pictured here, all of them intricate "machine controllers", available throughout the world, and priced from $4,000 to $10,000.

Simply stated, they are numerically-controlled, point-to-point positioning systems for machine tools, probably the simplest and most practical "automation" for medium size metalworking establishments. Though mechanically intricate, their purpose is simple—to operate cutters, jig borers, punch presses, and other tools from a program stored on magnetic tape, punched plastic or paper tape, or punched cards. Also, other industries see potentials—with equipment other than machine tools.

Numerical control is a means of making automatic control economical for short-run production. The method assigns coordinate numbers to every possible position for a tool such as a cutter. The desired positions of the cutter are then described in terms of the co-



EQUIPMENT: Autopilot two-axis positioning system. $9,900. MAKER: Mullard, Ltd., U. K.
FEATURES: A high-speed positioner for marking out sheetmetal parts, drawings, and for drilling chassis and templates. Intended for prototype work.



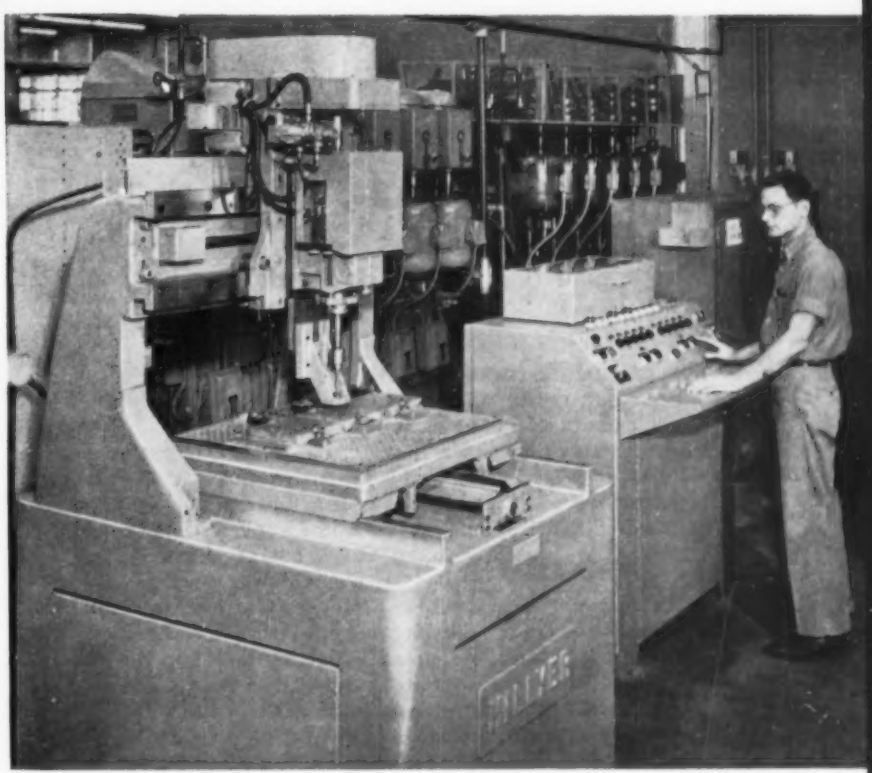
EQUIPMENT: Two-axis Micro-Positioner and console. $9,600. MAKER: Topp Industries, Inc., U.S.A.
FEATURES: Not a numerical control, but does much the same thing. Uses indented steel tape stretched along each axis. Photo shows console controlling radial drill.

in Industry

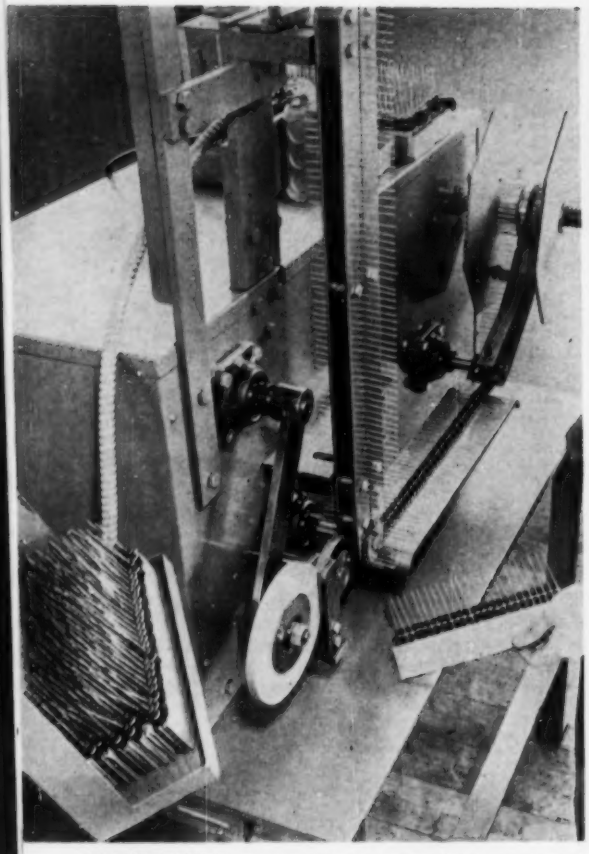
ordinates and a time axis; then this information is put on punched cards or a magnetic tape. The path of the cutter is then directed by the cards or tape.

Two numerical control systems have evolved. The first, continuous contouring, is very complex and expensive. The alternative, point-to-point positioning, first made a place for itself in aircraft manufacture and now is making strides in other industries.

An exhaustive survey recently completed by *Control Engineering* found 31 different point-to-point systems being produced in the U.S.A., Britain, Germany, and Japan. They have been put to work to control riveting machines, jig borers, welding machines, rotary tables, and turret drills. Six systems are pictured on these pages, with brief data on their performance and cost. *Control Engineering's* complete study of all 31 systems—a 72-page report—can be secured for $1.25 by writing INTERNATIONAL MANAGEMENT DIGEST, 330 W. 42nd Street, New York 36, N. Y., U.S.A. ●

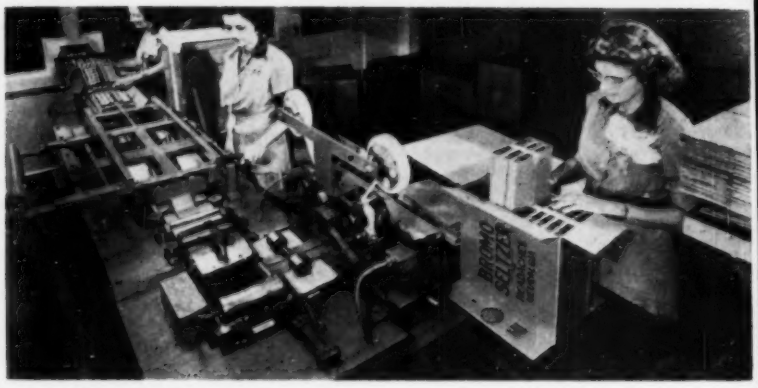


EQUIPMENT: Two-axis control for old or new machine. $6,000. MAKER: Hillyer Instrument Co., Inc., U. S. A.
FEATURES: Designed for firm's drill press (photo) but adaptable to other machines. Storage medium is 10-cm. paper or vinyl tape. Uses industrial-type relays; requires neither electronic nor stepping-switch circuitry.



ELECTRONIC components are joined in convenient units for use in an automatic assembly machine.

SWISS PRODUCE moves through automatic bag sealer that applies colored tape at a rate of from 20 to 90 bags per minute.



CARTON SLEEVES are automatically taped at both ends, slid into outer carton, and then rapidly prepared for shipment.

Versatile Tape Serves Industry

An engineering service now helps sundry businesses solve problems with pressure-sensitive tape.

Only yesterday sticky tape—"pressure-sensitive" tape, according to the manufacturers—was an item for repairing torn paper. Today it has combined with automatic machines and stepped boldly into a hundred and one industrial jobs, three of which are pictured above.

Sealing cans and bags, bundling electronic components, labeling cartons, are a few of the chores now done by these tapes. Many of these advanced techniques have come from engineering studies by U. S. A.'s largest tape manufacturer, Minnesota Mining & Manufacturing Co. ("3-M"). Working closely with machine builders, 3-M and its subsidiaries overseas have pioneered equipment that applies tape at a rate of 300 items per minute—a figure that soon may be increased to 1000.

A major advantage of pressure-sensitive tape is that it is always ready for use: placed in a mechanized applicator, the machine can begin operating immediately. After a shutdown, no time is lost for preparation. Also, tape can be preprinted with brand names.

Getting tape into the automatic factory has been aided by a consulting service set up by the international division of 3-M. The firm's engineers supply technical help on the mechanics of tape application, aid in the design of custom equipment for each tape user.

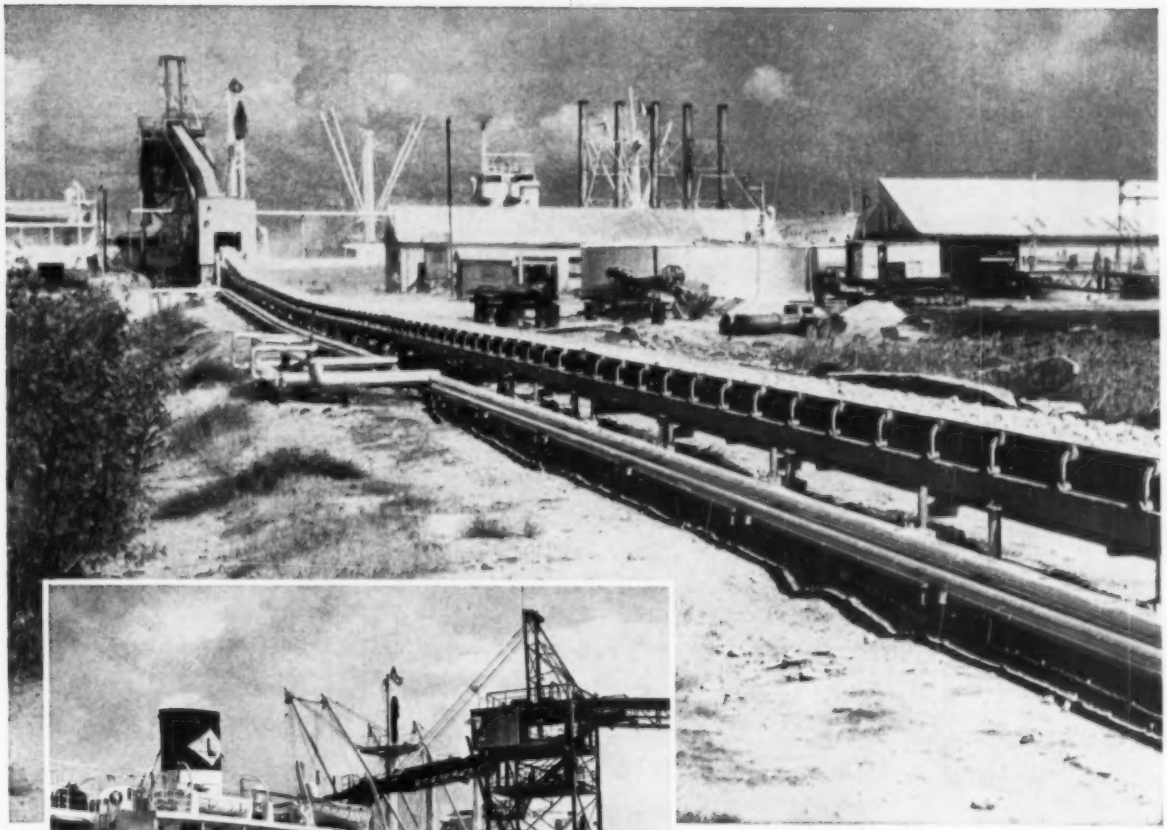
An example can be seen in the containers now used by some cleanser manufacturers. Formerly, customers had to punch holes in the metal top of the containers. Now these holes are prepunched and sealed with tape, which can be quickly peeled off by the user.

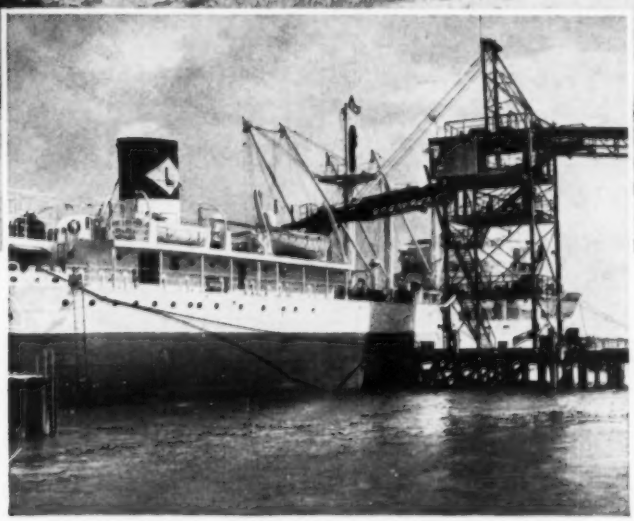
An automatic bag sealer was built for a produce firm in Switzerland that helps that firm put its apples and potatoes in eye-appealing polyethylene bags. The machine (picture, top right) applies red, blue, green, or yellow tapes; with the aid of a variable speed motor, it seals bags at any rate from 20 to 90 per minute.

Here are some other jobs done by automatic tape machines: applying lamination over display cards for a German button maker; folding and taping cartons of headache powders for a U. S. drug firm; imprinting brand names on cartons for a wine bottler. ●

How sulphur moves from vat to hold...

over 1500 ft. by belt conveyor





3-STAGE LOADING—Because sulphur is loaded directly from vats, this Link-Belt conveyor system is unusually long. 30-in. wide *horizontal belt conveyor* by Link-Belt (top) carries 500 tons of sulphur per hour to inclined belt conveyor 618 feet from vats. 300-ft. *inclined conveyor* elevates sulphur to loading tower and Link-Belt *boom conveyor*, which deposits sulphur in ship's hold (lower photo).

LINK-BELT

BELT CONVEYORS

14.827

LINK-BELT COMPANY: Engineers • Manufacturers • Exporters of Machinery for Handling Materials and Transmitting Power • Established 1875.
EXPORT DIVISION: 233 Broadway, New York 7, U.S.A., Cable Address: Linkbelt—New York • Australia, Marrickville (Sydney) • Brazil, Sao Paulo • Canada, Scarboro (Toronto) • South Africa, Springs • Representatives throughout the World.

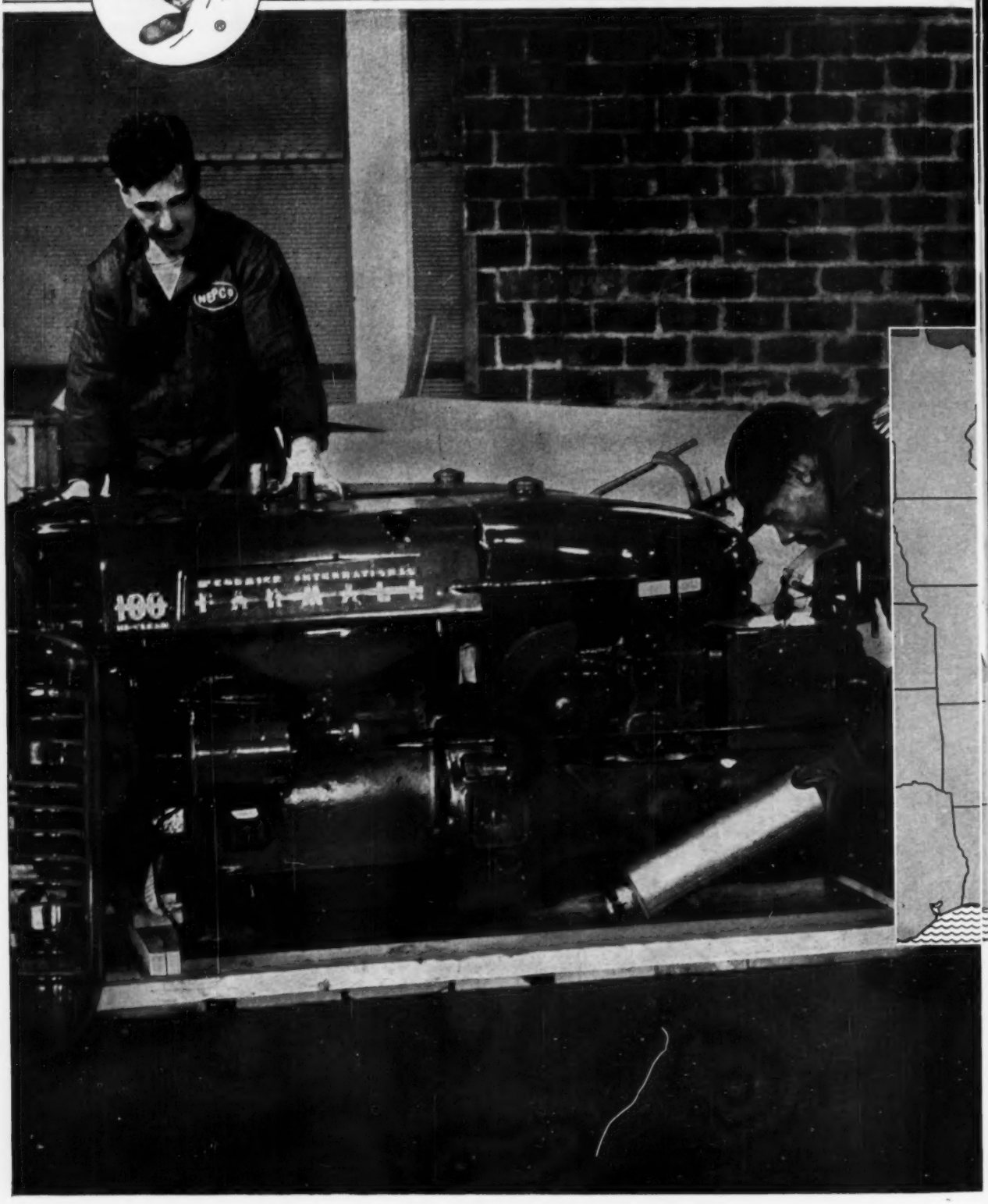
LINK-BELT belt conveyor system mechanizes long-haul loading at Cia. Impulsora Del Sur, S.A., subsidiary of Cia. De Azufre, Veracruz, S.A.

This modern installation serving loading docks at Coatzacoalcos, Veracruz, Mexico, shows how Link-Belt engineering and equipment met the challenge of moving 500 tons of sulphur per hour over ¼ mile from vats to ship's hold.

Such facilities are typical of the way Link-Belt materials handling systems are bringing all industries the advantages of continuous operation, large capacity and flexibility . . . helping boost profits by reducing per-ton handling costs.

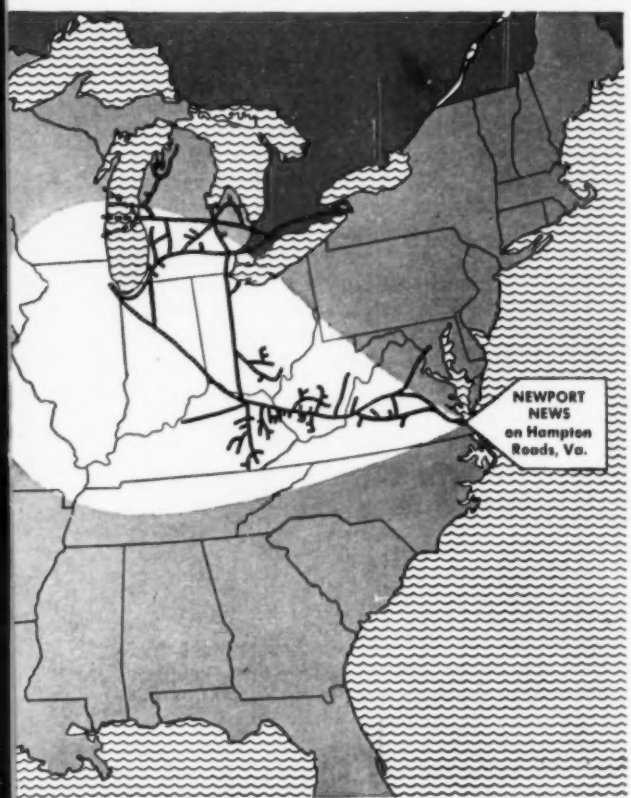
In addition to conveyors, Link-Belt equipment includes a complete line of idlers, trippers, drives and related items. Qualified by scores of successful installations in every industry, Link-Belt can recommend the most efficient system for your job with all elements integrated for top efficiency. For facts contact your Link-Belt representative or write direct.

SHIP THROUGH NEWPORT NEWS..



Export packing

It takes experts to do a proper job of packing for export. Experts who know just how to take a thing apart so it will go in the least space; and then package and crate it so it can be most easily reassembled at the other end. Experts who can look at the routing and know just what handling and climatic hazards it may undergo.



This is just one more example of the expert, dependable services that are available when you ship in or out through Chesapeake and Ohio's port of Newport News—the port that is closer to the Heart of America.

These Factors Make Newport News a Great Seaport

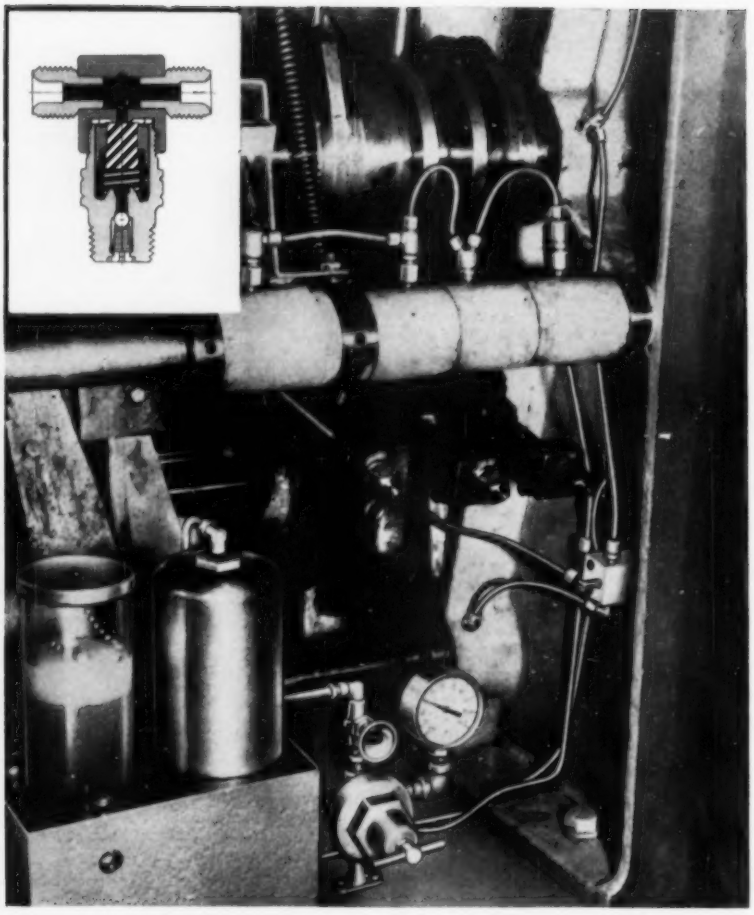
- strategic location
- efficient handling equipment
- storage in transit. Over 37 million cubic feet of warehousing facilities
- world's most modern bulk cargo unloading facility
- export packing service
- large covered merchandise piers
- coordinated rail-and-sea transport

Chesapeake and Ohio's World Commerce Department assists exporters, importers, forwarding agents, steamship operators on all matters relating to rail and ocean shipping of overseas and intercoastal freight. Write for free illustrated booklet telling why it's easier to use the C&O Port of Newport News.

Chesapeake and Ohio Railway

WORLD COMMERCE DEPARTMENT, NEWPORT NEWS, VA.

World Commerce Dept. Offices: New York 7, N. Y., 233 Broadway • Chicago 4, Ill., 327 S. LaSalle Bldg. Detroit 26, Mich., 525 Lafayette Bldg. • Richmond 10, Va., 823 East Main St. • Stockholm, Sweden, Kungsgatan 7



Midget Lubrication System

The "Accumite" is a low-pressure, positive-displacement type of miniature, centralized, lubrication system for machines having up to 200 bearings in restricted space—especially in the packaging, canning, labelling, and textile industries. A midget metering valve that handles all oils and light greases treats each bearing individually. It will deliver a specified amount of lubricant to each bearing, regardless of clearance or distance from the pump.

Systems are available with three types of controls: fully automatic (actuated by power-driven pump and timer); semi-automatic (pictured above, with power-driven pump), and manual (with hand-operated pump). **Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 4, Illinois, U. S. A.**

Industrial Radiography Unit

A lightweight industrial radiography unit (MG 100) that has just been produced is said to be powerful enough for tasks involving steel welds and opaque materials, such as aluminum, magnesium, rubber, plastics, porcelain, glass, and food products.

The unit weighs 45 pounds and is housed in an enameled steel case measuring 16-inch × 12-inch × 6¾-inch. It is connected to the tube-head through a flexible multiconductor cable. Kilovoltage regulation is stepless, and is continuously variable from 30 to 100 kilowatt-amps. **Instruments Division, Philips Electronics Inc., 750 South Fulton Avenue, Mount Vernon, New York, U. S. A.**

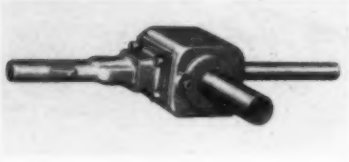
For Counting Stock

A new hand-operated counting device is designed for keeping a numerical check on stock. Known as the "Stoktrol", it consists of a small panel on which are mounted three telephone-type dials. Totals up to 999 appear in small windows at the top of the panel.

The "Stoktrol" works by subtraction. The current total of items to be accounted for is set in the top dials. As stock is issued, the number of the items withdrawn is dialed, and the fresh total appears. The three dials are allocated to units, tens and hundreds. Size of the panel is 17½ x 11 inches. **K. Bisset & Co. Ltd., 145 Grand Bldgs., Trafalgar Square, London, W.C.2, England.**

Miniature Solderer

A miniature soldering bit, no bigger than two pencils and weighing only seven grams, should prove useful for working with very fine wires. As the head of the soldering bit measures only 1.6 millimeters thick, it can reach spots that are not easily accessible for bigger tools. **Joisten & Kettenbaum GmbH, Bergisch-Gladbach-Herkenrath, Germany.**



One-Man Drill

"So light that one man can do the work of two" is how the manufacturers describe this aluminum hydraulic coal drill. High horsepower ratings and heavy pressures (up to 2,000 pounds per square inch) are possible too, thanks to the drill's novel design, which makes the electric motor operate and oil circulate only when the auger is rotating.

Two models of the drill—one 20, the other 30 pounds—are available. Both come with self-tramming power units or with a skid-mounted power unit that can be mounted on "T" trucks and mobile cutting machines. **Long Co., Oak Hill, West Virginia, U. S. A.**

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Pan American's 'round-the-world timetable is a working schedule for international cargo shipments. In addition to 6 all-cargo flights every week, *every* Pan American Clipper* carries freight; therefore *every* flight is a cargo carrier with pinpoint arrival and departure times.

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Your local Dealer will be pleased to take you for a demonstration drive in the Prefect or Anglia. Take the family . . . they'll love it.

NEW! Radiator grille in sparkling chrome NEW instrument binnacle with temperature gauge NEW wide-view rear window NEW lockable glove compartment NEW 2-tone trim and P.V.C. headlining. PLUS a front mounted 1172 c.c. motor and lower centre of gravity for better road holding. The two-door 'new look' Anglia de Luxe and the four-door 'new look' Prefect de Luxe. See them at your Dealer's NOW.

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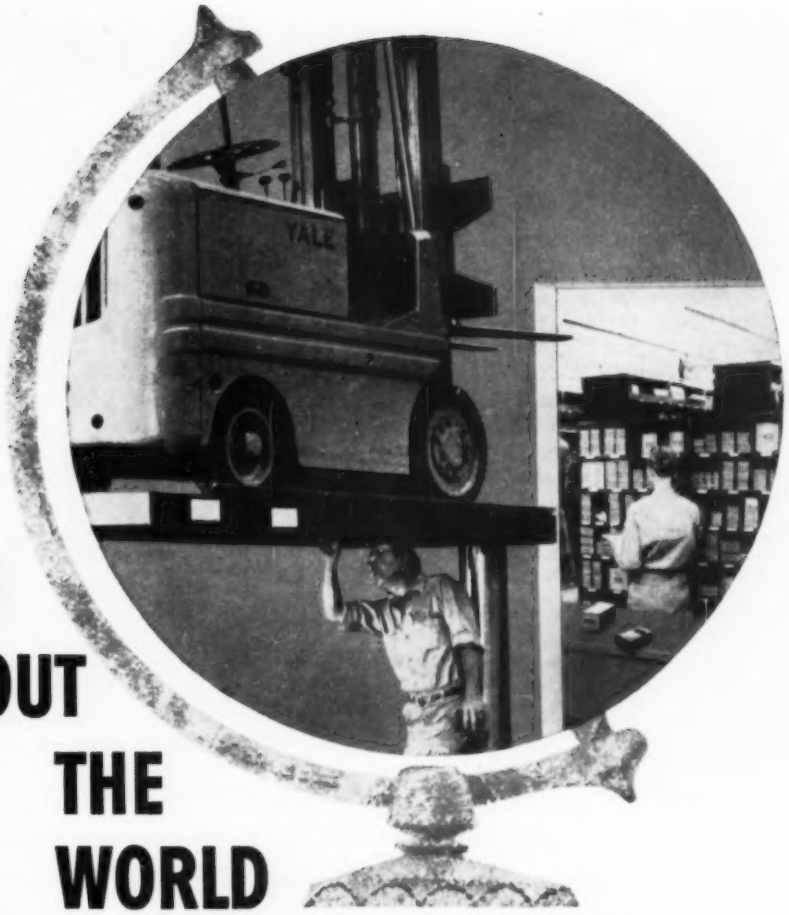

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Behind the Yale Industrial Trucks at work throughout the world are well-equipped Yale Sales and Service offices. Personnel have the training and skill to give you prompt, efficient service whenever your Yale Equipment needs it.

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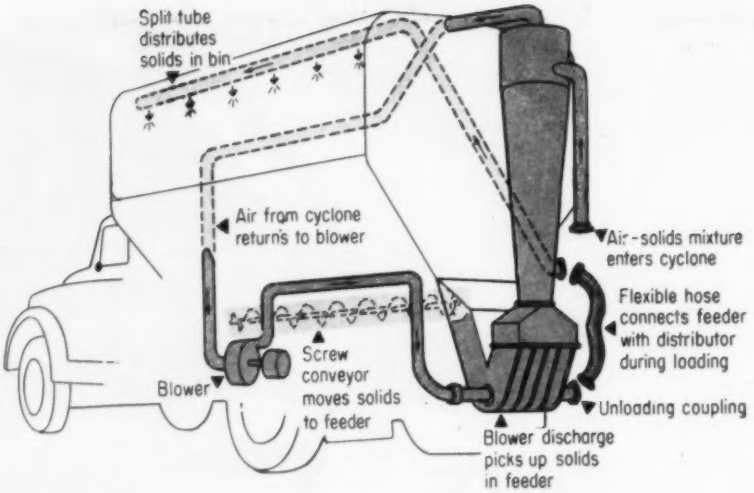
Central Heating—From the Floor

Research has just been completed on a carpet that can take the place of central heating in mild climates. It is actually an electrically-heated carpet underlay from which a connection can be plugged into the wall like an electric blanket.

Floor temperature produced by the carpet is 21-24 C. The carpet will heat all the air in the room evenly, according to the manufacturers, at a cost of about a penny an hour (roughly 1 cent). **Thermalay, Ltd., Shelf Mills, Shelf, nr. Halifax, Yorks., England.**


Split tube distributes solids in bin
Air from cyclone returns to blower
Air-solids mixture enters cyclone
Flexible hose connects feeder with distributor during loading
Screw conveyor moves solids to feeder
Blower
Unloading coupling
Blower discharge picks up solids in feeder

Built-in Solids-Handling System

Bulk quantities of dry, granular solids are transported quickly and economically in this self-loading truck. With its pneumatic handling system, the carrier can load itself from storage bins, then proceed to its destination and unload directly into bins or other trucks.

The truck has handled materials ranging from peanut shells to cement, with densities from 10 to 95 pounds per cubic foot.

No handling facilities are necessary at either the starting or the terminal point of the truck's journey. Only an access line and the internal piping are required on the storage bins at each point. The system provides an economical—and hygienic—form of transport that benefits both shipper and receiver. **Sprout, Waldron & Co., Inc., 60 Logan St., Muncy, Pennsylvania, U. S. A.**

Letterpress Ink Sets Instantly

Almost instanteous setting is the chief feature of a new letterpress ink called "Split-Sec." The ink also has a fast complete drying cycle and slow skinning rate, and is virtually odorless. **General Printing Ink Co., 750 Third Avenue, New York 17, N. Y., U. S. A.**

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HACKSAW BLADES

Victor makes a complete line of every type, pitch and size. No matter what the cutting requirements of the job may be, a quality-made Victor Blade can help you do the job better, faster and at lower cost.

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Cheaper IR Heating For Your Plant

A new German infrared generator is said to cut heating bills 20%-50%. It is particularly suited to space heating of high-bay buildings. But the generator has also speeded the unloading of frozen coal from gondola cars, by thawing a car in 7 minutes. And it has eliminated humidity-caused corrosion of steel stock by maintaining the steel temperature well above dew point.

Key to the unit's efficiency is the surface combustion of an air-gas mixture on a ceramic mat that soon reaches a temperature of 970 C. The mat emits radiant energy with wave lengths mostly between 1 and 11 microns. This temperature gives a high radiation efficiency and heat-transfer rate. **Schwank Gasgeraete GmbH, Koeln-Kalk, West Germany.**

STEEL COMPANY OF WALES

uses Euclid S-7 Scrapers for coal stockpiling

At its huge Margam plant, one of Europe's largest steel-works, the Steel Company of Wales is using two Model S-7 Euclid Scrapers for stockpiling and reclamation of coal. These British-built units are powered by a 147 h.p. Leyland diesel engine with a 5 speed transmission, and have a payload capacity of 7 cu. yds. struck.

Coal for the plant at Port Talbot is delivered by railway. An unloading system dumps the cars and a clamshell then loads coal into the "Eucs" for hauling to the stockpile. Heaped loads of about 9 cu. yds. are hauled and spread on the pile. Excellent maneuverability of the over-hung engine type scraper, plus the compaction of big tires, makes the S-7 ideal for the stockpiling work.

When reclaiming coal from the pile for plant use, the "Eucs" self-load without assistance of other equipment. During the annual two week mine holiday, the two scrapers recovered approximately 16,000 tons per week—half of the plant consumption.

Euclid Scrapers have proved their ability to move more material at lowest cost on all types of work—industrial operations like this one, overburden removal at quarries and open cast sites, road and airfield construction, and other earthmoving projects. Have the dealer in your territory give you facts and figures that show why owners say ***Euclids are your best investment.***

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EUCLID (GREAT BRITAIN) LIMITED • Newhouse, Lanarkshire, Scotland

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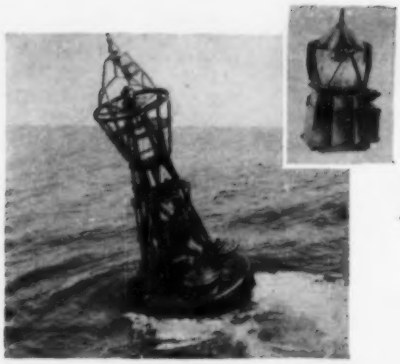
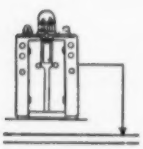


Where Performance Counts

WALLACE & TIERNAN EQUIPMENT IS USED

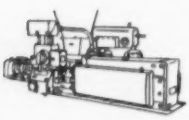
AIDS TO NAVIGATION

A W&T Buoy equipped with an electrically powered beacon, automatic lamp changer, flasher unit, and radio control equipment is shown above in service at a harbor entrance. Wallace & Tiernan equipment was chosen because of its dependability and economical operation. These qualities are typical of all W&T's navigational aids which include such items as lamp changers, flasher mechanisms, signal timers, fog horns, aircraft flasher units, and other related apparatus.



CHLORINATION

Equipment includes chlorinators of both the water and mechanical diaphragm types in all capacities, hypochlorinators, and many other auxiliary and accessory items designed for use in the treatment of water for sanitation as well as for numerous industrial purposes.



PROCESS FLOW CONTROL

Equipment includes chemical solution feeders, gravimetric and volumetric dry feeders, and gravimetric meters for use in the chemical, grain, and food processing industries.

PRESSURE SENSITIVE INSTRUMENTS

Equipment includes a complete line of aneroid and mercurial pressure sensitive instruments, such as altimeters, barometers, and manometers designed for use in industrial testing as well as for research purposes.

Other quality Wallace & Tiernan products and services used throughout the world are listed below. For further information send for list number F-105 of available free technical publications on all Wallace & Tiernan products.

Ammonia Control Apparatus — Cathodic Protection Systems — Chemical Feeders — Chlorinators — Decay Control Process for Produce — Electric Marine Beacons — Flour Processing Chemicals — Pharmaceuticals — Precision Instruments

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REPRESENTED IN MOST COUNTRIES

F-105

The "HP-85" is an easily dismantled concrete plant that can be taken down and erected at a new site in a matter of hours. And, according to the manufacturer, it has a production capacity ranging up to 200 cubic yards per hour.

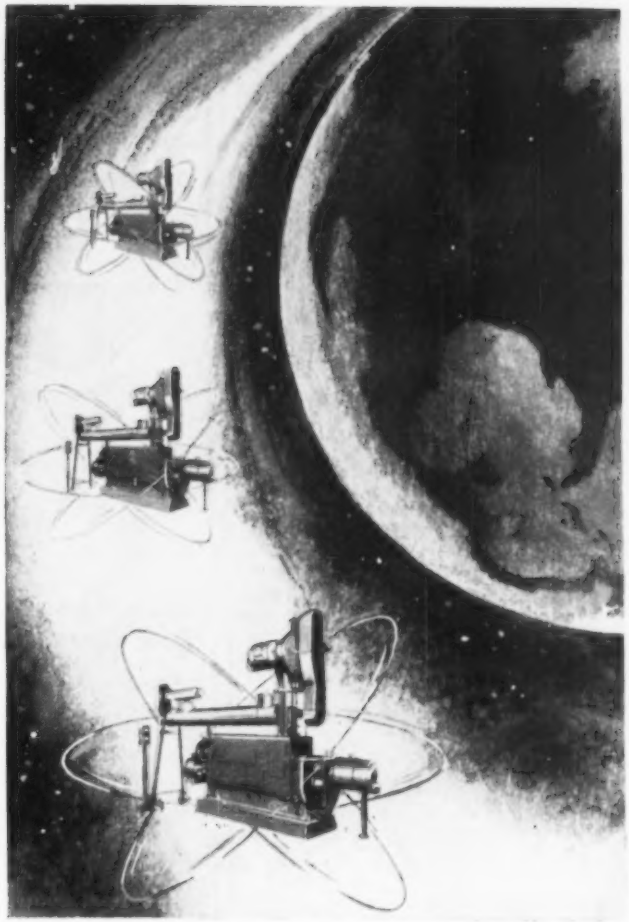
The plant is automatic and may be operated by one man. Alternatively, the batching can be done by truck drivers working the push-button controls located at ground level. **Butler Bin Co., Waukesha, Wisconsin, U. S. A.**

Easy-to-Work Dictator

Fully transistorized, the "Audograph Key-Noter" is simple in appearance and simple to operate. Push buttons control Talk and Listen. A turn of the scanning dial makes it possible to listen to any part of the recording.

The instrument is only book size, and this and its shock-resistant construction makes it good

A NEW SATELLITE IN THE OIL MILLING ORBIT



Super-Duo

55 EXPELLER!

ANDERSON'S research and engineering staff has placed a new Expeller in the vegetable oil milling orbit . . . a machine that triples capacity over conventional presses! This outstanding production is gained without sacrificing residual oils or increasing operating costs. In fact *the cost per ton of processed material* is the lowest ever obtained with any screw press.

Make your oil mill as profitable as possible. Gain added production, mechanization and long machine life with the durable Super Duo 55 Expeller. For more details on this vegetable oil process, write outlining your process. We will be glad to quote on any of your oil milling requirements.

THE V. D. ANDERSON COMPANY

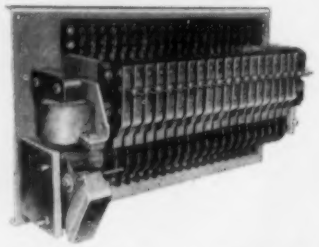
division of International Basic Economy Corporation

1962 WEST 96th STREET • CLEVELAND 2, OHIO

ANDERSON EXPELLERS

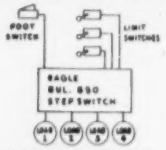
Write for the new Anderson Expeller Catalog describing how you can make your oil mill operations more profitable with the Super Duo 55 Expeller.

NEW
STEP SWITCH
SIMPLIFIES CIRCUIT SEQUENCING
...FOR MACHINE TOOLS, PRESSES, CONVEYORS, PROCESSES



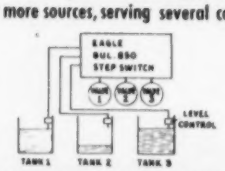
Heavy duty unit consistent with all other industrial components, simplifies interlocking or sequencing of multiple load circuits. Operates directly on the AC line voltage eliminating rectifiers. Each circuit is electrically independent and may be closed for one to sixteen positions of the switch. This one device replaces complex relay circuits.

HUNDREDS of APPLICATIONS are PRACTICAL
here's 3 basic ideas for a starter



SEQUENCE TIMING
Use with a foot switch (or limit switches) to set up load circuits in specified sequences.

ALTERNATING—COUNTING
Use to count a preselected number of units from one or more sources, serving several conveyors.

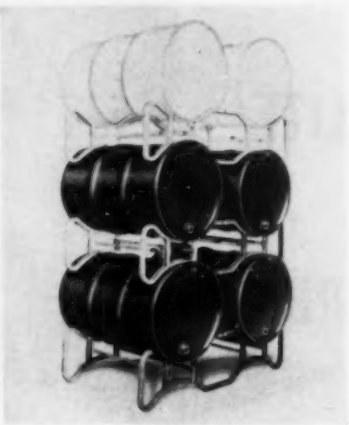


SEQUENCE SELECTIVE CONTROL
Use to search out a selected condition and set up the load circuits accordingly. The self-advancing step switch contact connects the valve circuit to a full tank.

Write today for information and prices to:

EAGLE
SIGNAL CORPORATION
Export Department
13 East 40th Street, New York 16, N. Y.

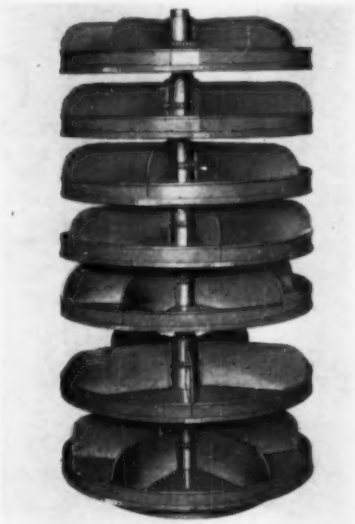
for travel as well as office use. **Gray Mfg. Co., Hartford, Connecticut, U. S. A.**

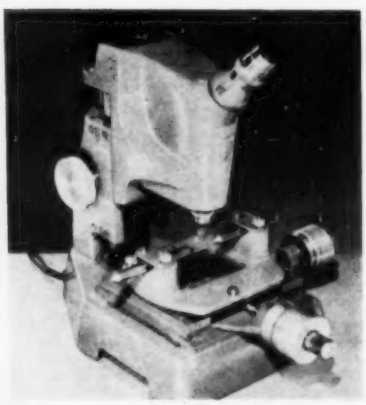


Drum Rack Permits Easy Stacking

A heavy-gage steel rack increases drum handling and storage efficiency by permitting easy stacking with standard fork-lift trucks.

This compact unit supports 7,500 pounds in 18-gage drums and 14,000 pounds in 16-gage drums. Containers can be stacked to any practical height, and individual drums or pairs are readily removed without excessive handling of others in the stack. A two-drum lift may be made from the front, back, or sides. **Republic Steel Corp., Pressed Steel Div., 6100 Truscon Avenue, Cleveland, Ohio, U. S. A.**





Toolmaker's Microscope

Drills, taps, jigs, templets, milling cutters, and other small work parts can be inspected and measured with this industrial microscope. The working distance is 4 inches, allowing for a focus of up to 2½ inches in depth on the object being inspected.

Total range of magnification with interchangeable eyepiece and objective lenses is 27 to 360 times.

One of the instrument's accessories is a protractor eyepiece for measurement of angles. A center support with centers, easily attached to a cross-slide stage, permits measurement of cylindrical objects.

Manufactured by Bausch & Lomb Optical Co., the microscope is available from **DoAll Co., Des Plaines, Illinois, U. S. A.**

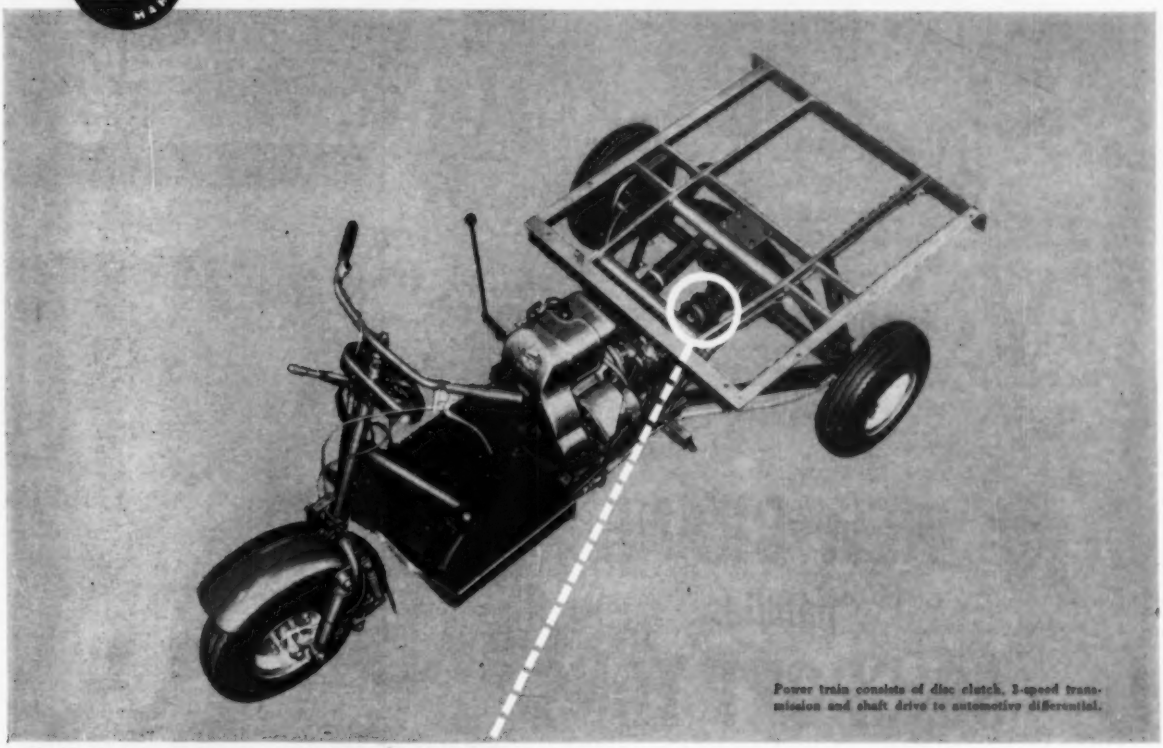
Revolving Shelves for Stored Parts

Stored parts like bulk stock, nuts and bolts, are easier to keep track of in these revolving shelves. The shelves turn in either direction on ball bearing rollers. Models are available with four or seven shelves. **Lyon Metal Products, Inc., 1933 Montgomery St., Aurora 2, Illinois, U. S. A.**

Antidust Agent

This new compound will help prevent dusty soils from being blown away by winds. The manufacturer says its effects last from two weeks to two months. The pro-

Outboard Marine—power products for work and recreation



Power train consists of disc clutch, 3-speed transmission and shaft drive to automotive differential.

SHAFT DRIVE . . . gives the Cushman Trucksters more power with less maintenance

No belts, pulleys, chains or sprockets rob power from the Cushman Truckster. Direct shaft drive, engineered with precision, delivers the power and eliminates the major causes of failures in ordinary light hauling vehicles. In fact, everything about the Truckster is built for long service and easy maintenance.

The Truckster is ideal for hundreds of light hauling jobs. Test it for easy handling and maneuverability . . . rated payload 800 pounds . . . up to 50 miles per gallon . . . speeds up to 35 miles per hour . . . turning radius just 80 inches.

A Truckster body style to suit your need

PROFIT WITH CUSHMAN—Cut delivery and hauling costs in your present business with a versatile Truckster, OR be a Cushman dealer. Franchises are available in selected areas. Write to: Cushman Motors, OUTBOARD MARINE INTERNATIONAL, S.A., Post Office Box 830, Nassau, Bahamas. Dept. C13-5.

Cushman **—economy, versatility, dependability in light hauling vehicles.**

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duct is a cold-water-soluble starch derivative, a 2% to 4% solution of which may be sprayed over fields with conventional insecticide spraying machines. Suggested dosage: 110 to 220 pounds per 2.5 acres. **W. A. Scholtens Chem. Fabriek N.V., Foxhol, Netherlands.**

For Inclined Conveyors

Chief feature of the "Ridgetop" corrugated belt is its flexible ribs, which are said to deflect under the load and provide a firm grip at angles up to 45°. **New York Rubber Corp., 100 Park Ave., New York, N. Y., U. S. A.**

Tape in the Factory

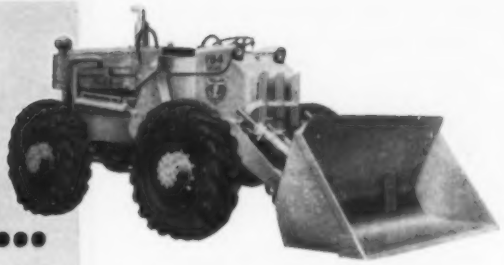
Teflon tape is applied to a heat-sealing bar in the photo above—one of several applications for "Temp-R-Tape", which is pressure-sensitive and designed to hold fast at −38C to 262C. Currently used in the packaging, textile, paper, and food processing industries as a low-friction, non-stick facing, Temp-R-Tape comes in a

YOUR KEY TO HIGH PRODUCTION...

YALE & TOWNE

TROJAN TRACTOR SHOVELS

Any of these Trojan models can provide a king-size contribution in transforming your 1958 production picture . . . This is evidenced by the blistering sales pace set during 1957 . . . More prospects are discovering and more owners discovered that Trojan is the easiest handling tractor shovel they had ever operated — that Trojan meets all competition head-on by out-maneuvering, out-hauling and out-loading for a conclusive show of superiority . . . You eat-up stock-piles with straight line horizontal thrust, you get complete safety from reverse curve safety arms and correct power to weight balance for greater stability . . . Watch a Trojan work, then you'll know!

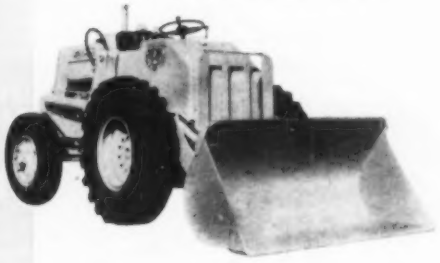


MODEL 154

2 cu. yd. cap., 4-wheel drive with Torqmatic transmission.

MODEL 104

1 ½ cu. yd. cap., 4-wheel drive with Torqmatic transmission.



MODEL LHM-75

1 ¼ cu. yd. cap., 2-wheel drive with torque converter.

MODEL 404

4 cu. yd. cap., 4-wheel drive with Torqmatic transmission.

By witnessing a competitive demonstration between Trojan and any other model of the same class, you will see beyond a doubt how Trojan's many 'plus' operating features enable it to outperform time after time . . . Ask for such a demonstration any place — at any time!

TROJAN YALE & TOWNE

TROJAN* *REG. U. S. PAT. OFF.

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TRACTOR SHOVELS

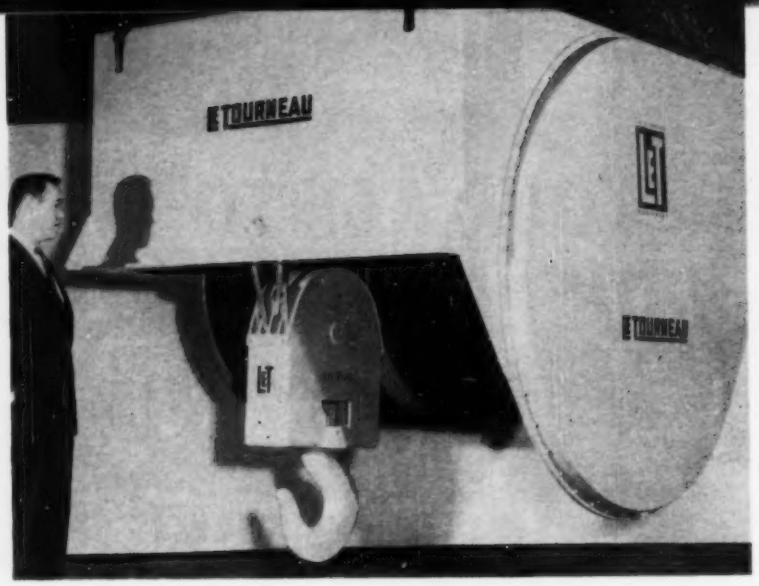
2 & 4 Wheel Drive Front-End Loaders

CONTRACTORS MACHINERY DIV., THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA

number of different forms. One variety of the tape called Temp-R-Tape C, only .002-inch thick, is used chiefly as electrical insulation. **Connecticut Hard Rubber Co., 407 East St., New Haven 9, Connecticut, U. S. A.**

Harder Wax for Tubes

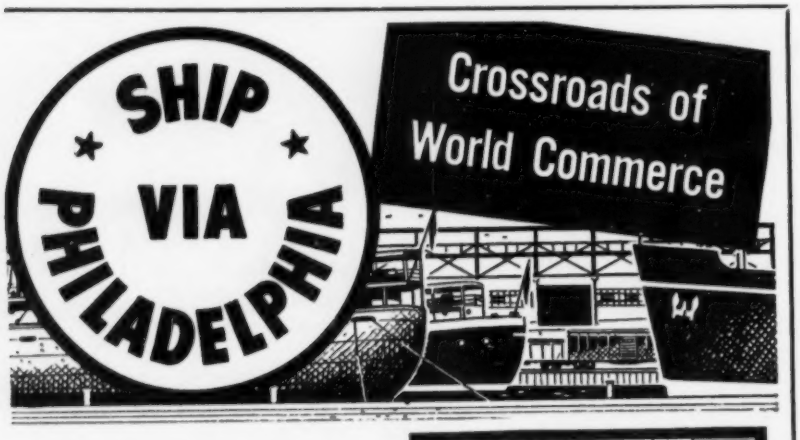
A harder, more even coating for internally waxed metal tubes has just been developed. The manufacturer claims that the new coating widens the variety of products that can be packed in tubes, since it gives greater protection to the product from the metal walls of the tube—and vice versa. The coating is produced by a new flush-waxing process said to be suitable for tubes of all metals, as well as rigid containers. Flush-waxed metal tubes already are in commercial use for toothpaste, aqueous adhesives, pharmaceuticals, and cosmetics. **Venesta, Ltd., Vintry House, Queen St. Place, London E.C.4, England.**



Gentle Giant

This huge electric hoist could, to use the manufacturer's phrase, "lift 20 full-grown elephants to the height of an 8-story building" —that is, it has a capacity of 45 tons, a lift height of 103 feet.

Just as important as its strength, however, is the precision with which the hoist handles its loads —a precision of .008-inch. An instant-action electric motor combined with a twin-brake system gives the machine its unusual control. **R. G. Le Tourneau, Inc., 2399 South MacArthur, Longview, Texas, U. S. A.**



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Prints Plastic Bags

The Model 45 H machine makes instant-drying, non-smearing imprints on surfaces like plastic bags, envelopes, labels, etc., with an output of up to 90 per minute.

The machine employs the Thermomark process which, used with Touchdry marking compound, imprints with a controlled printing head. The Touchdry compound, normally solid, is melted and dries on contact with the object being printed—which can therefore be handled immediately after marking. **Markem Machine Co., Keene 49, New Hampshire, U. S. A.**

Corrugated Aluminum

A new aluminum corrugated sheeting has been designed. It has 1-inch wide troughs depressed ⅛-inch, at pitches of 2, 3, 4 or 6 inches, and provides an attractive panelling with enough "shape" to resist buckling. **Northern Aluminium Co., Ltd., Banbury, Oxfordshire, England.**

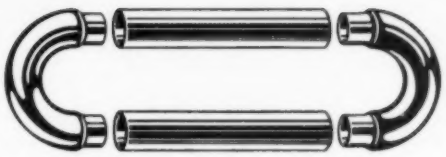
MUELLER BRASS CO. QUALITY PRODUCTS

for refrigeration and air conditioning heating and plumbing

One dependable source for all your requirements . . . from fittings to forgings

180° RETURN BENDS

A complete range of sizes for condensers, cooling coils, etc., with plain or cupped ends. Both O. D. wall thicknesses and center-to-center dimensions carefully matched to customer's specifications.

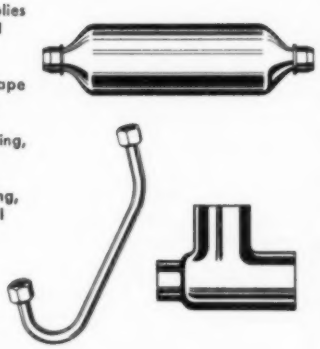


STANDARD AND REFRIGERATION TUBING

For all piping, refrigeration, and air conditioning requirements, Mueller Brass Co. Streamline copper tubing is available in all required wall thicknesses, and hard or soft tempers.

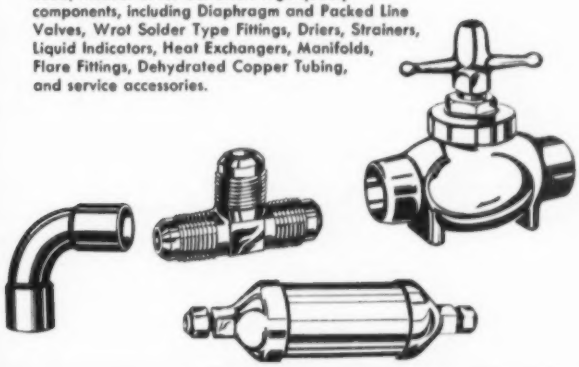
FORMED COPPER TUBE AND ASSEMBLIES

Mueller Brass Co. supplies formed copper tube and assemblies with special bending temper. Cut to customer's size and shape specifications. Complete facilities for swaging, bending, spinning, upsetting, flaring, flattening or sealing, beading and grooving, drilling, piercing, machining, joining . . . all at consistently close tolerances.



REFRIGERATION PRODUCTS

For virtually every refrigeration and air-conditioning need, Mueller Brass Co. offers high quality components, including Diaphragm and Packed Line Valves, Wrot Solder Type Fittings, Driers, Strainers, Liquid Indicators, Heat Exchangers, Manifolds, Flare Fittings, Dehydrated Copper Tubing, and service accessories.



APPLICATIONS

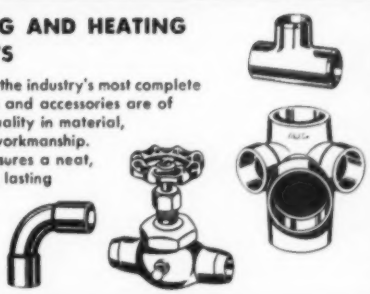
For sugar and paper mills, breweries, distillers, and other industrial applications, Mueller Brass Co. copper tubing is supplied to customers' specifications.

PACKING

Mueller Brass Co. can pack mixed groups of items for delivery to different job sites for any customer—an added saving to you by reducing rehandling costs.

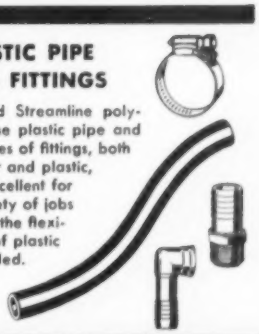
PLUMBING AND HEATING PRODUCTS

"Streamline", the industry's most complete line of fittings and accessories are of the highest quality in material, design, and workmanship. Streamline assures a neat, efficient, long lasting installation.



PLASTIC PIPE AND FITTINGS

Rugged Streamline polyethylene plastic pipe and all types of fittings, both copper and plastic, are excellent for a variety of jobs where the flexibility of plastic is needed.



203

40 OUR 40TH YEAR MUELLER BRASS CO. 1917 1957

MUELLER BRASS CO. Port Huron 43, Michigan, U.S.A.

Cable address: Streamline

Roof innovations include air-lifted panels of aluminum . . .

. . . ground-built steelwork, lifted

Factory Techniques Arrive at

Prefabrication plays a key role; so do part-standardization and mechanized methods at the building site.

TWENTY YEARS AGO, men dreamed of buildings that would be made in factories, shipped to the site in big segments, then put up overnight like a huge child's Meccano toy. But today, the factory-made houses, schools, and machine shops have not quite materialized as planned.

Though builders have modified their thinking, what has happened has been even more revolutionary than the dream. In place of total prefabrication has come component prefabrication, standardization, and factory methods at the site. A large number of elements such as windows, doors, staircases, roof trusses, are factory-made, even in conventional houses. Other buildings find savings in aluminum and plastic panels, prestressed concrete beams, segmented domes for roofs.

In its 1958 Survey of Industry, Trade and Finance, the *Manchester Guardian* notes that the use of standardized components at times can prove almost as economical as total prefabrication, while allowing more flexibility for builders. Errors or change in design can be corrected by clever construction men at the site, whereas prefabrication allowed no leeway.

Also, many contractors are still sold on a certain amount of on-the-site cutting and forming. Some say the old methods are cheaper, though this is debatable. What is true is that many construction men lean toward some on-the-site workmanship; they say that no pre-planning is perfect, problems arise during construction, and the solution is materials that can be cut and shaped.

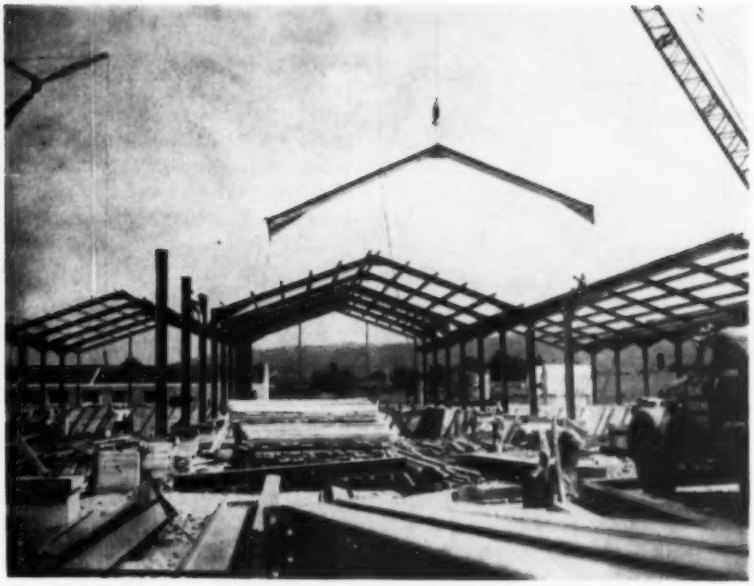
Prefabrication was expected to do much for school building. It has, but in modified form. The original plan ran up against an inherent conflict between architects and educators, the same that exists between builders and home buyers. Architects saw major economies that could be achieved by factory-producing the same school for different locations. Educators demurred: Their schools, they said, required different facilities than others, the site and its size dictated other changes.

The compromise now being promoted in the U.S.A. is called "modular design." Here standardization of components replaces standardization of buildings. Schools can vary widely in size, function, even looks, but close to 100% of the components are standardized. Structural elements, walls and ceiling, are based on a single-sized module.

Britain has gone much further than the U.S.A. in school prefabrication. The British aim has been to get more schools as fast and as cheaply as possible. Since 1949 they have relied heavily on prefabs, with no prejudice against standardization of schools. As a result, school-building expenditures have been cut 20% while other costs have gone up.

The construction revolution has been most evident in industrial building: factories, office buildings, warehouses, bridges. Prefab components have played a big role. They have included such items as wide panels of aluminum (with window casings included) for office buildings, beams and girders

nto position by hydraulic jacks . . .



. . . wide-span, prefabricated sections of structural steel.

Construction Sites

made of prestressed reinforced concrete, large steel structural sections for roofs.

A novel method developed in the U.S. uses kite-shaped panels of aluminum for making geodesic domes for roofs. Such roofs have been built for factories and auditoriums, and one soon will cover a shopping center in Venezuela. Most of these domes were assembled and raised with the aid of tall center masts and a series of winches. A recent installation (picture, far left) substitutes bags of air, which are inflated as the roof takes form.

Prefabrication at the site today speeds up many big construction jobs. A good example is a series of four bridges being built in western U.S.A. Over 100 prestressed-concrete girders will be used, each of them 36.5 meters long. They are being cast near the bridge approaches, then guided into place by chain hoists and traveling gantries.

In the same area a steel-framed roof covering an area of close to 10,000 square meters was built on the ground, then lifted about seven meters (center photo) onto 16 supporting columns. The roof trusses had been prefabricated, but welded together with the aid of six tons of rod at the site. Lifting the 1,600-tons was done by 24 hydraulic jacks.

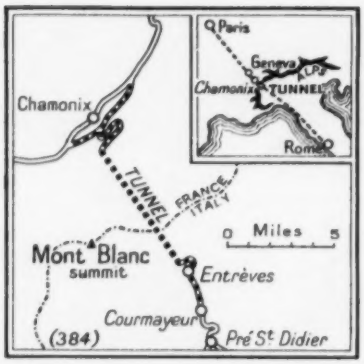
Factory-style forming and assembling jobs are being done at many construction sites. Concrete floor slabs are cast—and lifted into position. Underwater pipelines are joined into lengthy sections on dry land, then eased out to where they can be put together with a minimum number of underwater welds.

Techniques for quantity pouring of concrete constantly are being improved. A U.S. firm began assembly-line pouring of complete homes some years ago; the complex steel form is moved from one house site to the next by cranes. A British contractor recently erected a 10-story concrete apartment house in 19 days by use of a Swedish-designed slip-form system. The forms moved upward as lower sections were completed.

Two basic money-saving advantages come from prefabrication, whether it is done at a factory or at the site. Small time-consuming and labor-consuming operations are eliminated, with important savings. Also, the building goes up faster and therefore can be used or rented earlier. ●

Partial assembly on shore means less underwater joining of pipe.

Air bag replaces 16 men in erecting prefab worker houses.



Road Will Tunnel Under Mont Blanc

French, Italian, and Swiss interests appear ready to bore a 12,000-meter hole through Mont Blanc, the longest road tunnel in the world. Initial money for the project is part of the 1958 French budget, and preliminary work is expected to get under way soon. The four-year job will cost the French about $3,500,000, the Italians not much less, and it will be aided by Swiss loans.

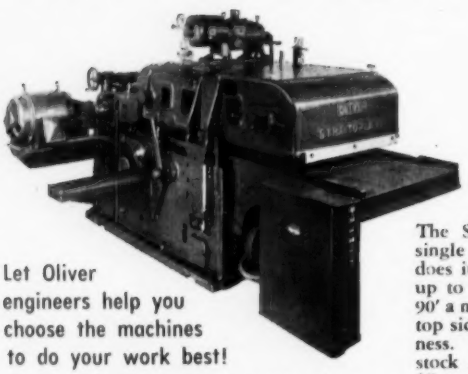
When completed, the tunnel will offer an all-weather, straight-line highway from Rome to Paris. During bad weather motorists currently must either skirt the Alps through Nice and Marseille, or move their cars on special equipment through two existing railway tunnels. The planned tunnel will cut 200 kilometers off the Rome-Paris trip, as compared with the route through Nice.

The tunnel—which has been under consideration for over 30 years—was authorized by the Italian and French governments more than a year ago. It will be built and operated by a French-Italian company under a 70-year charter.

The highway will enter Mont Blanc near Chamonix at a height of 1,300 meters, and run to a point near Courmayeur, Italy. The tunnel roadway will be six meters wide, allowing ample two-way traffic; another meter of width will permit a curb on one side and a walk on the other.

Ventilation of the tunnel will be accomplished by powerful fans at each heading. Fresh air will be pumped through a duct below the roadway, foul air exhausted through a duct above it. The system is expected to minimize engine fumes and at the same time reduce the temperature, which otherwise might be near 50 C at mid-tunnel. (*Times Review of Industry, March, p* 82)

OLIVER woodworking machines save money doing the finest work



Let Oliver engineers help you choose the machines to do your work best!

For 68 years Oliver engineers have designed tools and machines for woodworkers to produce the smoothest work, quickly and accurately. Among these money-saving machines are: Band Saws, Saw Benches, Surfacers, Jointers, Jig Saws, Shapers, Tenoner, Sanders (Belt, Disk, Spindle, Vertical and Double-End Drum), Woodturning Lathes, Mortisers, Borers (Vertical and Horizontal), Multiple Spindle Carvers, and Millers. Write for details.

Only the Straitoplane takes stock out-of-wind and planes both sides smooth in one pass

The Straitoplane does the work of a single surfacer and a facing planer, and does it better! Planes stock out-of-wind up to ¼" on each side at speeds up to 90' a minute. Bottom side is face jointed, top side planed smooth to desired thickness. The Straitoplane takes twisted stock of any length, 1½" to 36" wide, ½" to 6" thick. It planes pieces as short as 16" when fed singly. Many narrow strips can be surfaced at one time. No other machine matches its production.

Used with two cut-off saws in an Oliver conveyorized line, the Straitoplane with three men can process 24,000 feet of lumber in 8 hours. Get all the facts.

OLIVER SINCE 1890

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

In Construction

● **CONSTRUCTION IN LATIN AMERICA continues its ambitious growth**—despite the area's many pressing problems (IMD, March, p11). A McGraw-Hill survey estimates that new projects and work-in-process will come to $16,000-million in 1958, up substantially from 1957 (note, however, that many projects supposed to be finished last year are carried over). The increase is accounted for by power plants, railroads, airports, harbor works, housing—which now seem to be emphasized in Latin American budgets over past favorites such as highways and buildings. (*Construccion, March, p* 44)

● **THE COLLAPSE of the steel and concrete roof** of a year-old factory in Mexico City a few weeks ago has engineers puzzled. A possible cause of the failure was the vibrations of heavy machinery used in the folding-box factory. The structure consisted of concrete-covered metal decking and light steel framing supported by concrete block walls and reinforced concrete columns. Some of the columns came down when the roof caved, killing two and injuring 190.

● **ARCHITECTS who designed the outdoor opera amphitheater** recently built in New Mexico, U.S.A., selected a point about 18 meters behind the stage as the radius point for each row of seats. Each of the auditorium's 480 seats will thereby be focused on the same spot. The stage has been designed for optimum acoustics. The roof slants upward, while the wings slant outward. A pool, between the orchestra pit and the seating area, deflects the sound toward the audience. Rows of baffles in the ceiling help direct the sound outward, provide a "feedback" for singers' voices, and mask flood and spot lights. (*Electrical West, March, p* 84)

LOOKING AHEAD

Technology

Flashbulb With Its Own Power Source

A photographic flashbulb which carries within its metal base a small primary cell composed of layers of magnesium foil, absorbent paper, and copper has been developed by the Battelle Memorial Institute, U.S.A. The tiny cell produces enough power to flash a bulb when its base is moistened with water. Scientists at Battelle have built bulbs of various sizes and used them to make photographs.

Pyroceram Moves into New Fields

Ball bearings and engine pistons may someday be made from Pyroceram, the new glass-ceramic developed by Corning Glass Works last year. Pyroceram bearings stand up under temperatures of 580C, and when they fail, it is by gradual erosion rather than any chewing action. Pistons of the new material may minimize corrosion and offer closer control over the expansion difference between pistons and cylinder walls. (Product Engineering, March 17, p 87)

Japanese Pulp Made by Continuous Process

Continuous pulping, with many advantages over the batch system, has invaded Japan. A new mill of Takasaki Paper Manufacturing Co. has begun producing 120 tons of kraft pulp per day from beech and pine with the system. Kraft paper and liner board will be made. The equipment includes a screw feeder, four digester tubes, disc refiners, pulp washers, and high speed screens.

Color Photos Aid Oil Prospecting

Black-and-white aerial photography for several years has helped engineers survey potential oil territory, spot structural patterns, fault lines, unconformities. Now a U. S. firm, Baker Surveys Corp., has turned to color for added help. A colored mosaic—pieced together from many high-level photos—shows variations in vegetation, soil changes, and other features that lead to the best drilling locations. (Petroleum Week, March 14, p 28)

Egypt May Use Its Marshland Weeds

Egypt, which each year imports millions of dollars worth of cellulose to make rayon and paper, may have found a substitute in its wide areas of weeds and bamboos. The National Research Institute of Cairo experimentally has used the local products to produce a cellulose that reportedly is equal in quality to imported wood cellulose. (Chemical Week, Feb. 15, p 24)

Electron Tube the Size of a Transistor

An electron tube not much larger than a shirt button, yet capable of operating at temperatures from 500 C to 900 C, has been developed in the U.S.A. by General Electric Co. Still in the laboratory stage, it is made of layers of titanium and a ceramic. (Business Week, March 22, p 154)

Getting Longer Service out of Wood

Lumber life may be increased up to eight times by treating the wood with a preservative known as Boliden salt (zinc-copper-chrome arsenate), developed in Sweden. The treatment requires only three hours, and yields lumber which is clean, odorless, resistant to decay, fire and termites. (McGraw-Hill American Letter, Feb. 1)

● A faulty part of machinery, a cracked gear or a thinned plate, can snuff out a life or ruin a business.

● Manufacturers and maintenance men now have an armory of testing techniques that help . . .

You Leave Nothing to Chance

Digested from POWER, March, p115

NONDESTRUCTIVE TESTING is today playing a more vital role in keeping the wheels of industry moving, as well as in insuring the quality of a new product. No manufacturer can afford to wait until his product has been put to use before finding out whether it is free from defects. Nor can a factory manager stand by with blind faith in his machinery, gears, piping, storage tanks—until an accident brings a costly shutdown.

The objective of nondestructive testing is to prevent trouble before it appears, to discover defects, to predict the strength, quality, and serviceability of parts. This is important to every industry. It is important when a product is made, and later, after the product has seen service.

A wide variety of tools and techniques are becoming available around the world for testing materials and parts, each method with its own advantages and limitations. One of the most reliable is X-ray, including the related techniques of fluoroscopy and isotope radiation. Other methods coming into prominence employ ultrasonics, resonance, magnetic fields, black light, and fluorescent liquids. Some of the more versatile techniques are discussed below.

1. Radiography

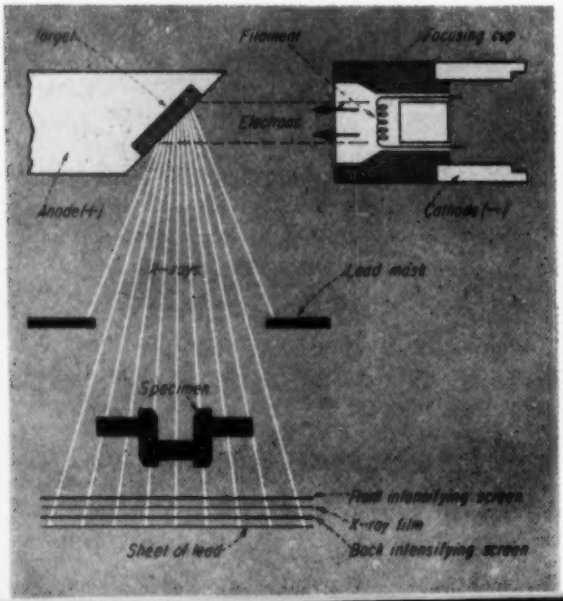
X-ray and isotope radiography do substantially the same thing. In both cases, rays pass on an object to be tested and record the structure and defects of the product on a sensitive film (see diagram below). A radiograph is in essence a shadow picture. When the film is developed, the more penetrable parts of an object—voids and flaws in a casting, for example—show up as dark marks, and the more opaque parts as light areas.

X-ray instruments are rated on the basis of the the voltage generated by the machine. Sizes range from 50-kilovolt units, used in inspecting wood, plastics, and thin metal sections, to machines generating millions of electron volts and capable of penetrating a half meter of steel.

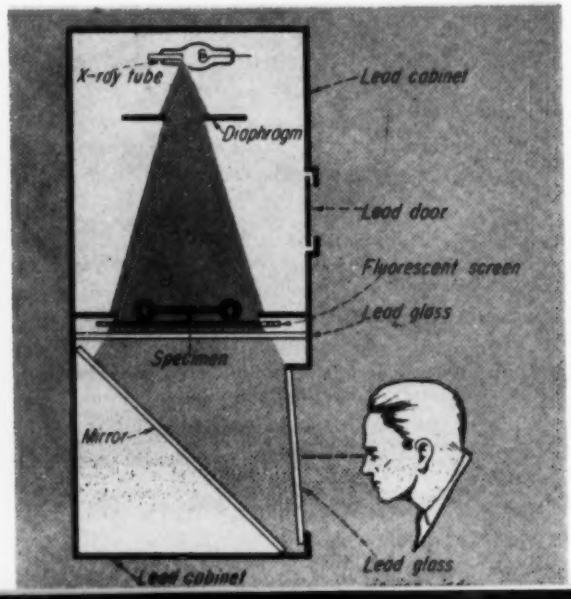
X-ray machines can be either mobile or fixed. Where the material to be tested is portable, the machine is set in a room protected from radiation escape. A crane often supports the X-ray tube, allowing freedom of focus. For examining fixed or hard-to-move objects, machines are carried or mounted on trucks. Some machines are self-propelled and can pass through pipe lines.

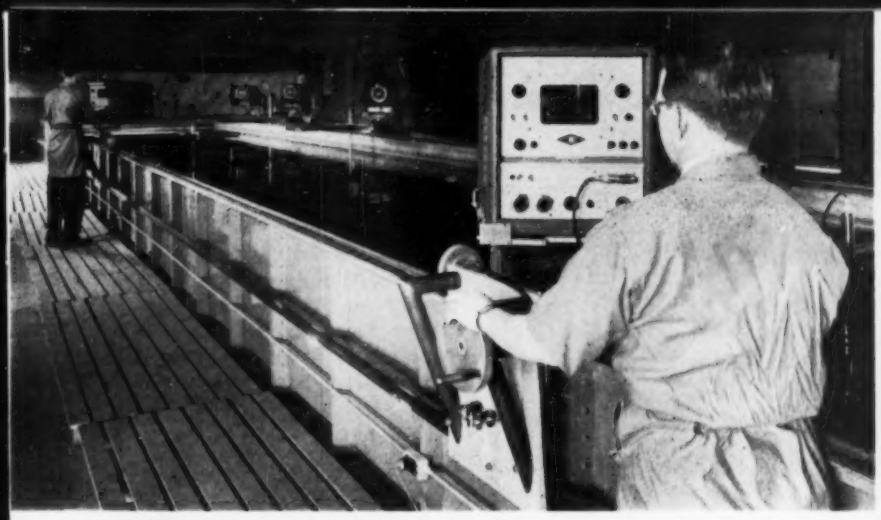
The photographic effect of X-rays can be greatly increased by using intensifying screens on both sides of the film. A powdered fluorescent chemical or lead foil commonly is used. Lead filters and masks often are used to di-

BEAMS from X-ray tube pass through a suspected part and record defects and voids on a specially sensitized film.



INDUSTRIAL FLUOROSCOPY gives the maintenance man a quick in-action check on products and machinery.





IMMERSION testing submerges ultrasonic instrument and part in water.

minish or control the wide arc of radiation scatter.

Isotope radiography today is replacing high-voltage X-ray in a growing number of applications (IMD, Apr., p 56). In this new technique, gamma rays from a capsule of radioactive material, such as cobalt-60, take the place of the X-ray tube.

Gamma-ray cameras are light, need no power source, and normally require no maintenance during the life of a radioisotope. They are preferred to X-ray machines for thick sections of metal. Exposure time depends on source strength, not on electric amperage or voltage.

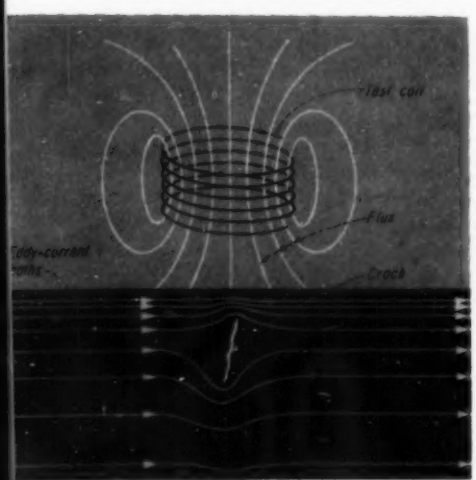
Besides cobalt-60, the most used radioactive sources today are the isotopes iridium-192 and cesium-137, and the naturally-radioactive element radium. Each is characterized by its own gamma-ray strength and its own half-life (the time it takes for the material to lose half its strength).

Hundreds of other radioactive sources now are being evaluated or studied. Their use in international industry will depend on their ray intensities, half-lives, availability, and cost. Radium and cobalt-60 today are used to radiograph steel sections as thick as 20 centimeters, detecting flaws or voids in the same manner as X-rays.

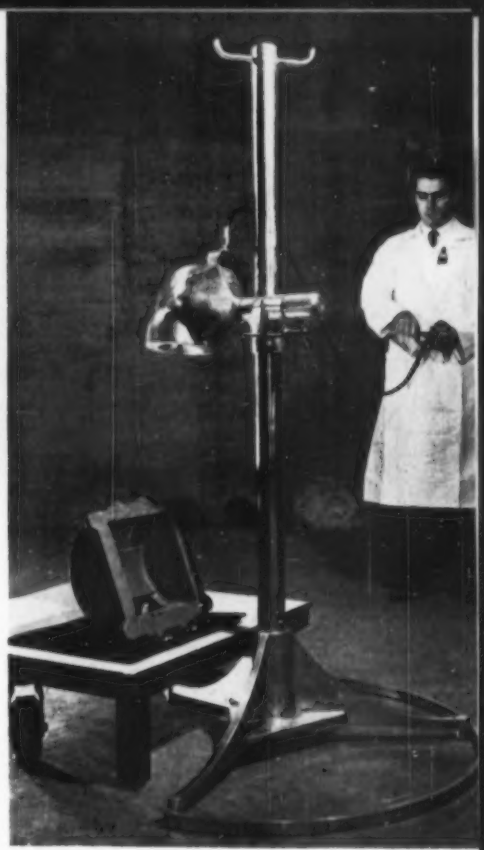
Fluoroscopy differs from radiography in that X-ray image is viewed directly on a fluorescent screen rather than on a developed film. This means greater speed and low cost, but generally a poor image. Image brightness is being improved by X-ray tubes that produce very high-intensity beams, and by image intensifier tubes and screens.

Fluoroscopy has proven its value to many industries. In the electrical trade, it is used to check wire continuity and insulation, voltage fuses, timing mechanisms, insulators, resistors, and capacitors. Plastic manufacturers find it of value in spotting flaws in castings and extrusions. The rubber industry uses it for checking faulty fabrics in tires. The food industry has welcomed fluoroscopy as a means of detecting foreign matter in processing, and sometimes packaged food products also are fluoroscoped.

Photofluorography and X-ray television systems also show promise. Photography of the fluorescent screen has been used in medicine for some years; improvement of lenses and screens now point to greater industrial uses. Television systems, now being tested, would replace the fluoroscopic screen and offer the convenience of remote viewing.



EDDY-CURRENT testing: Faults show as distortions in current pattern.



RAYS from isotope iridium can probe through 3-cm. of aluminum casting.

II. Silent Sound

Ultrasonic testing consists of sending inaudible sound waves at a material or part under test, and then recording either the passage or echo of these waves. The technique differs from ultrasonic cleaning or machining in that it uses relatively weak sound which has no organic effect on the specimen. Equipment includes a transmitter, a receiver, and an amplifying system.

"Ultrasound" is produced by stimulating a thin crystal with rapidly alternating current. Crystals are piezoelectric, and expand and contract at great speed as the current is applied from one direction and then reversed. As ultrasound does not travel well through air, it is directed to the specimen either through an oil film (contact inspection) or a column of water (immersion inspection).

Three methods of ultrasonic testing are used: (1) through-transmission, (2) pulse-echo and

BLACK LIGHT enables inspector quickly to spot defects in strainers.

(3) resonance. Through-transmission, a predecessor to the pulse-echo method, often gives results where other methods cannot be used. In contrast to pulse echo, it uses two crystals, one for sending sound and one for receiving it.

Through-transmission may be compared to putting a flashlight on one side of a goldfish bowl and a light meter on the other. Clear water in the bowl would offer about 100% transmission, but the presence of silt or a fish would diminish the reading. The through-transmission method does not give the depth of a flaw or fissure, but only its presence and magnitude.

The pulse-echo method is akin to the depth-sounding techniques used at sea. A portion of the sound rebounds as the waves hit a surface. Other portions continue through the material until they hit another interface—a flaw or the opposite side of the material—and in turn reflect back to the listening crystal. The several echos are converted into a series of vertical lines or "pips". The left-to-right progression of these pips represents the time sequence of the returning sound, and shows the thickness of the material. If a flaw is in the material, it appears as another pip between those that indicate the top and bottom of the specimen.

The height of these flaw-indicating pips shows the approximate area of small flaws. Evaluation of flaw size is done by comparing the recorded flaw with sound signals from "artifical flaws" in a set of test blocks of the same material.

Small and medium-sized parts often are best tested ultrasonically by submerging the part and crystals in a tank of water. The technique is used most widely by the missile and aircraft industries for testing their complex forgings and extrusions.

The resonance method of ultrasonic testing differs from pulse-echo and through-transmission in that frequency of sound is constantly varied many times a second. This is basically a thickness measuring method, though it can be adapted to detecting laminar flaws.

Any piece of material has a natural resonance point, which is a function of the thickness and sound-speed of the material.

By use of the proper wave length, pips can compare the thickness of a material under test with a norm. The method is similar to the way a musician finds the pitch of a tuning fork by striking successive keys of a piano.

III. Magnetism and Light

Other testing techniques now finding an important place in the maintenance shop and the factory are based on magnetic fields, induction of currents in materials, chemical coatings, and black light. The principles are not new, but instruments for using them have become more precise and versatile.

Eddy-current testing is done by bringing a part to be tested within range of a magnetic field. The eddy current is induced in a metal part by surrounding it with a wire-wound coil or by placing a coil (probe) near the material. A flaw in the metal shows up as an impedance in the flow of the current.

Maintenance men find eddy-current instruments valuable for spotting defects in tank walls, boiler tubes, structural parts, and for analyzing the chemical composition, hardness, conductivity, and permeability of metals. The technique is used on both ferrous and non-ferrous metals.

A practical means of finding surface or near-surface cracks in heavy castings or weldments is available in magnetic-particle inspection. A wet method and a dry method are used. In the wet method, the part is coated with a paste of magnetic particles in water or oil. The dry method dusts magnetic powder over the part.

Once coated, a direct or alternating current is passed through the part. Invisible cracks in the material attract the finely divided magnetic particles. The particles point a finger at the defect, and mark its extent on the surface of the part under inspection.

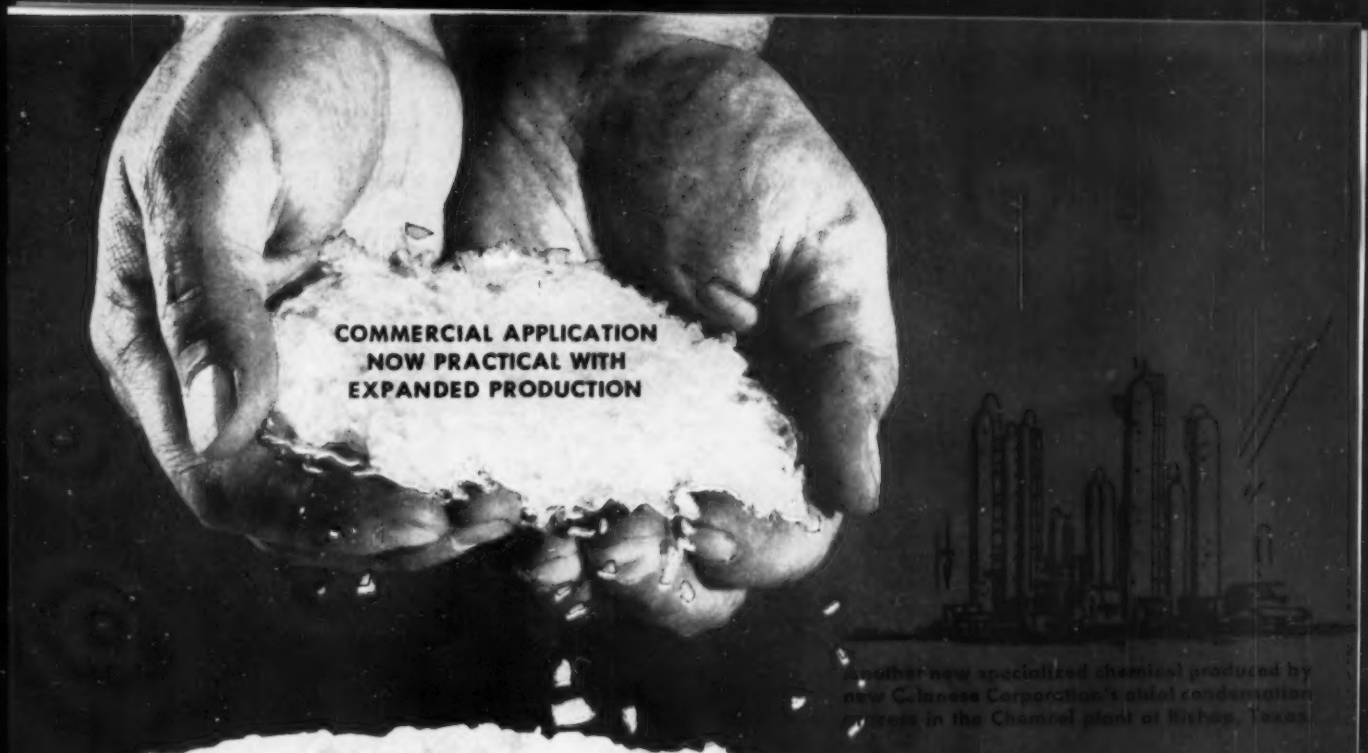
The principal limitation of the magnetic-particle technique is that it can be used only on magnetic materials, and it is not suited for very small, deep-seated defects. Also, the surface to be inspected must be available to the operator, which is not equally true of radiation and sound techniques. Magnetic-inspection, however, is fast and economical.

Black light—invisible rays near the ultraviolet range—often is used in conjunction with magnetic-particle inspection. But it has a far broader range of applications.

Basically, black light is an aid to visibility. Though not visible itself, it causes many materials to glow in normal light, helping the eye to isolate defects and foreign matter.

Applications include such diverse jobs as spotting fungus growth, prospecting for minerals, and examining foods for freshness, contamination and rot. In the factory, black light has been employed for (1) finding leaks in fuel, hydraulic, and pneumatic systems; (2) inspecting vessels for leaks; (3) determining the completeness of paint coatings.

More complete facts on nondestructive testing are available in *Power's* 24-page report, reprints of which will be sent to INTERNATIONAL MANAGEMENT DIGEST readers for $1.00 per copy. ●



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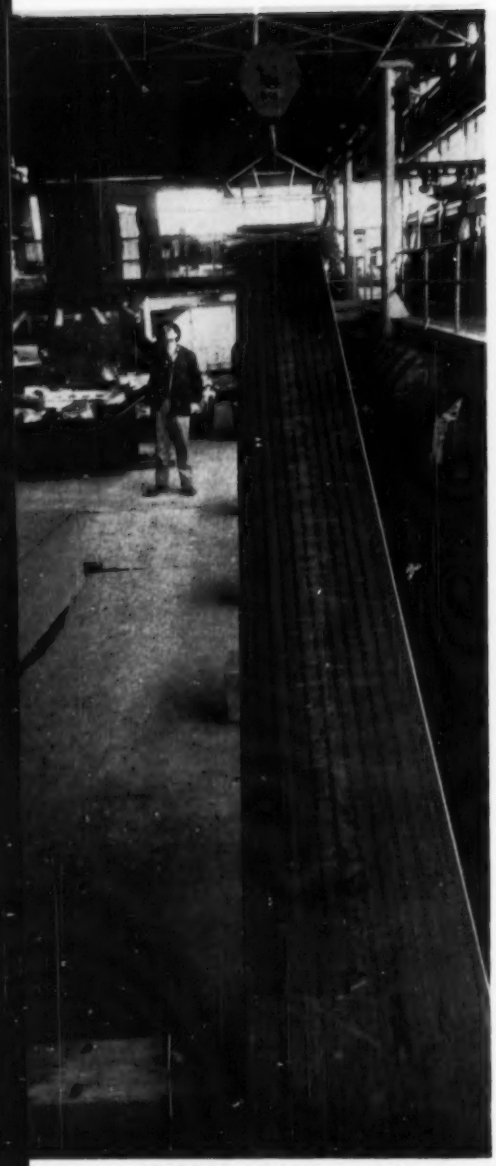


COPPER—eight tons of it—emerges from its bath in 10-meter water pit.

Copper Comes in New Sizes

The copper industry in the U.S.A. has come up with a continuous casting technique that promises more efficiency for the smelter, and ease of handling for the mill that rolls the copper cake into sheeting. A unit recently installed in the New Jersey plant of American Smelting & Refining Co. turns out cakes 12.7-cm thick at a rate of 20 tons per hour (photo).

The cake is .9 meters wide and some 7.5 meters long as it comes out of a bottomless mold, but it can be cut by a circulating saw into convenient lengths for the mills. The big advantage is in a thinner slab of optimum weight. In the past, mills had to settle for light-weight slabs or those with greater thickness (15-cm).

The continuous casting unit shares honors at the New Jersey plant with the world's largest electric copper smelting furnace, boasting a capacity of 30 tons per hour. Together they have transformed the appearance of the copper plant. Gone is much of the noise, much of the escaping heat. The traditional casting wheel—molds hung on a horizontal turntable—has been replaced by a small control booth facing two rectangular holes in the floor.

Casting takes place in a graphite mold that is cooled by water circulating at a rate of 11,370 liters per minute. As the copper emerges from the mold, it is supported by a hydraulic ram and sprayed by jets of water. The ram lowers the slab into a 10-meter-deep pit of circulating water.

Because the graphite mold is self-lubricating, the surface of the copper cake is almost mirror smooth (though it is streaked with film stains from the water jets). Its internal structure is very dense. This, combined with the fine surface quality, is expected to cut mill rejects substantially.

Continuous casting will mean major reductions in manufacturing costs. A graphite mold can outproduce a casting wheel with 24 conventional molds. American Smelting believes that the casting wheel is now as obsolete "as the horse and carriage," and anticipates that other copper refiners will turn to continuous casting in the not-too-distant future. (*Business Week, March* 15, *p* 149) ●

Gas Flows Become Visible

With transparent models, engineers avoid costly design changes in gas ducts and tanks.

Studying how gases operate in ducts and flues represents a teasing problem for engineers. A novel method is to build a model out of transparent plastic, and visually watch the gas in action. U. S. A.'s Research-Cottrell Inc. has done this to improve the performance of their electrostatic precipitators, and thereby minimize suspended matter in gas streams and improve flows.

Though proved on precipitators, the system can be used to improve all types of gas-handling operations. An engineer merely looks through the transparent model to see the existing conditions in his system. Injection of smoke into the air stream clearly shows the flow paterns.

Visual observations by themselves normally show up areas of no-flow, turbulence, and eddying. The engineer then can change the flue configuration in the model and test whether or not it improves the flow pattern. Such model changes eliminates the need for costly changes in equipment as it is being developed.

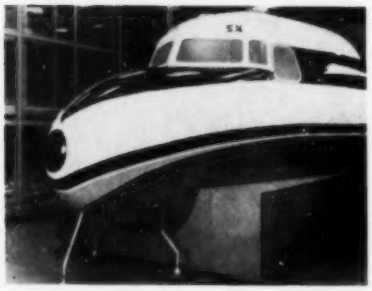
When a problem at Research-Cottrell requires a model, an engineer scales drawings of the commercial unit down to 1/16 of actual size. Craftsmen cut the parts from 3-mm. Plexiglass sheet, and join them with cement. Internal parts such as turning vanes are simulated in sheet metal.

Results obtained with transparent models have correlated well with later performance of corresponding commercial units. Model studies have shown how to reduce the pressure drop in systems. Models also have indicated how certain components, such as drop-out hoppers, can be left out of a system with resultant savings.

At Research-Cottrell, the use of transparent models has resulted in design changes to the precipitator itself. Baffles that were previously used to correct gas flow are now unnecessary, lowering cost and pressure drop.

The firm says that the cost of its model work is negligible. A model costs only .5% of the installed cost of a precipitation system, and savings run eight to ten times this amount. (*Chemical Engineering, Mar.* 24, *p* 70) ●

Good Reasons for Flying *Royal*



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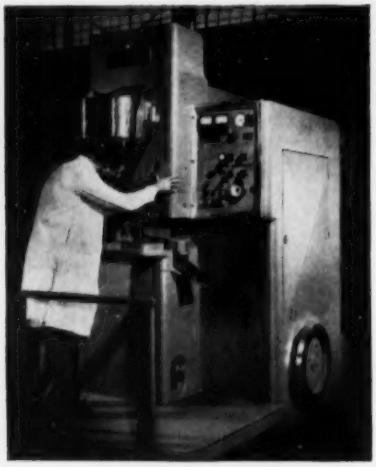

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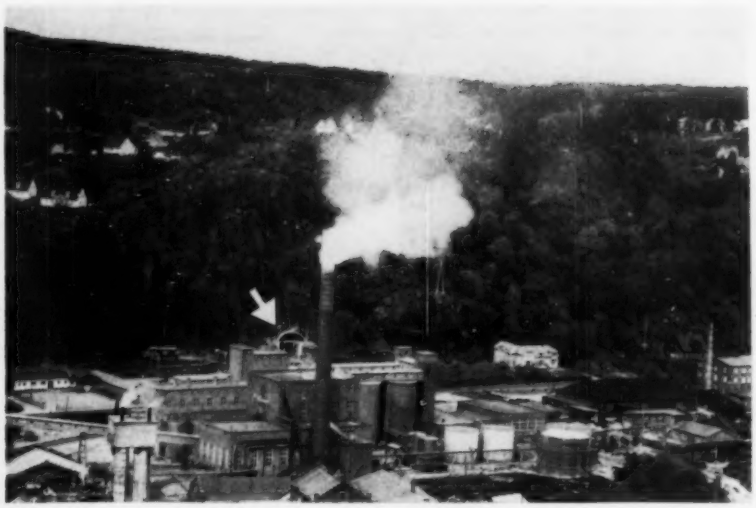


HEAT from underground reactor (arrow) will make steam for paper mill.

Atoms Also Supply Heat

Industry uses far more heat than electricity, and much of this may come from atomic reactors.

CAN ATOMIC REACTORS supply the world's factories with industrial steam? The problem is being given close study by U. S. and European engineers; its technical aspects have been largely explored. The question is one of economics: Can a nuclear source do the job at a price competitive with coal, gas, and oil?

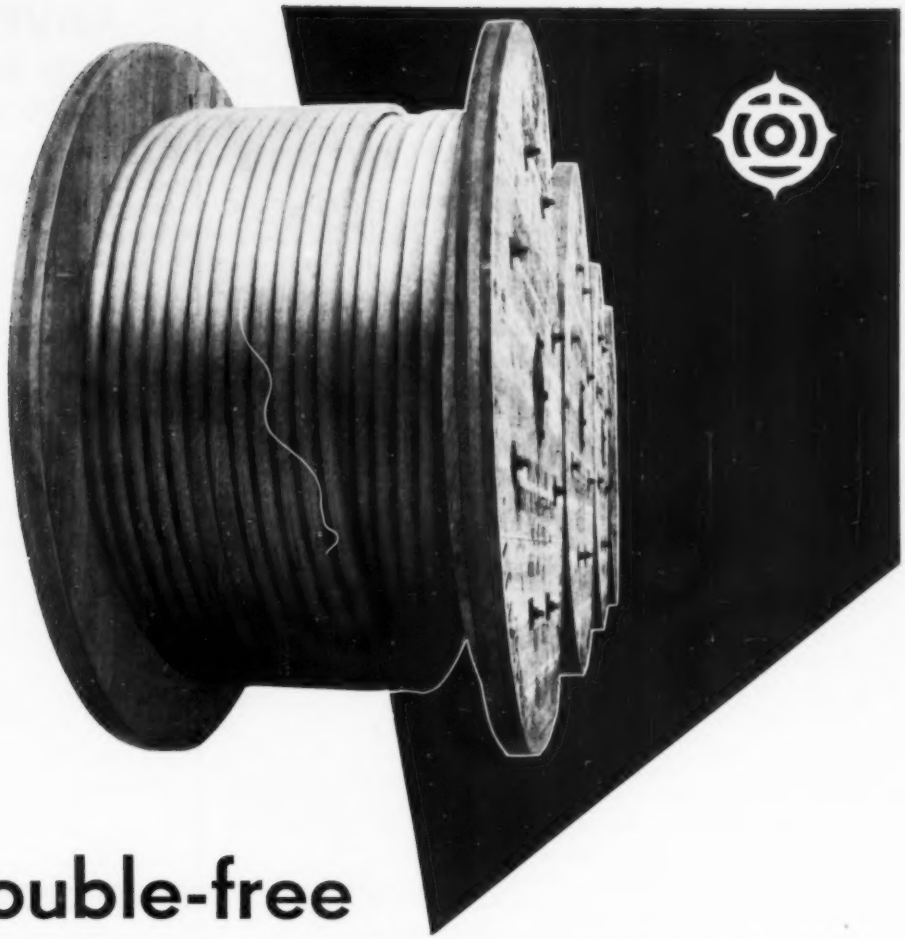
The chances are that atomic heat someday will find its place economically. In fact, experts believe that eventually atomic energy will be used more for steam and heating than for electricity. This will come about as fossil fuels become more scarce and more expensive, and as the atomic industry begins to flourish.

In the meantime, significant experimental steps are being taken toward the development of industrial heat reactors. When Norway's Halden reactor (picture above) goes critical this year, it will be the first plant to use its atomic heat output to supply steam to an industrial operation. Low-pressure steam will be channeled intermittently to a nearby paper and pulp plant. This will be incidental to the operation of the test reactor, but it will yield valuable cost data and operating experience.

An almost unlimited market awaits atomic heat. The world today uses far more energy in the form of heat than it does in the generation of electrical power. The demand for industrial heat will continue to rise at a sharp angle. In the U. S. A. alone, the consumption of industrial heat is expected to rise from 10×10^{15} Btu to 14×10^{15} Btu in the next ten years.

Two classes of industrial-heat reactors will be built in the future. High-temperature reactors, supplying steam at temperatures of 825C or higher, will be specially tailored for certain chemical and metallurgical operations. Low-temperature reactors will supply process steam for a broad spectrum of industries: textiles, fertilizers, petroleum, pharmaceuticals, pulp and paper, alumina, sugar and corn products.

These industries use saturated steam at pressures of 3.5 to 10.5 kg./sq. cm. for driving excess water out of materials. They also use low-pressure heat to aid in the precipitation of chemical reactions at an economical rate. Various reactors now being developed can be easily adapted to produce steam for these purposes. (*Nucleonics, Feb., p* 62) ●



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"Research Report 20" will tell you how to develop a sound company structure or modernize an existing one. It describes and analyzes major organizational problems, and explains the mechanics of organization. $4.75. (American Management Associaiton, 1515 Broadway, New York 36, N. Y.)

An important book on PR.

"Corporate Public Relations," written by one of the U.S.A.'s most respected practitioners, discusses the importance of intelligent public relations to successful business management. You will find principles and policies for developing good will, as well as the right and wrong approaches to public relations. 178 pages, $3.50. (Harper & Brothers, 49 East 33rd Street, New York 16, N. Y.)

New bulletins from industry

An 88-page manual tells how to produce a wide variety of metal shapes by cold roll forming. (The Yoder Company, 5500 Walworth Avenue, Cleveland 2, Ohio) . . . Equipment for converting sea water into palatable fresh water of high purity is described in catalogs AD-149, AD-161, and AD-164. (Cleaver-Brooks Company, 326 East Keefe Avenue, Milwaukee 12, Wisconsin) . . . A management consultant offers a checklist of planning the improvement of profits. (Bruce Payne & Associates Inc., 1 Avery Place, Westport, Connecticut) . . . The American & Foreign Power Co. has prepared two booklets (part of a series) giving information on investment opportunities in Brazil and Mexico. (American & Foreign Power Co., Area Development Dept., 2 Rector Street, New York, N. Y.)

Puzzled by the intricacies of foreign trade?

"International Economics" will prove a useful guide, and will bring you up-to-date on rapidly-changing exchange and tariff problems. 186 pages, $2.25. (University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois) . . . "Profitable Export Marketing" discusses export operations, market surveys, research techniques, and sales agents. The general principles given are applicable anywhere in the world. 192 pages, $4.50. (Newman Neame Ltd., 50 Fitzroy Street, London W1, England.)

Three world trade directories

The 1958 edition of the "FBI Register" lists the products and services of over 7,500 British firms. 1118 pages, 52s or $5.88. (Iliffe & Sons Ltd., Dorset House, Stamford Street, London SE1, England) . . . The "BDI Germany Supplies" is a four-language directory (German, English, French and Spanish) listing the names and addresses of German firms manufacturing over 70,000 products. 2000 pages, $10.00 or DM 42.00. (Gemeinschaftsverlag GmbH, P.O.B. 508, Darmstadt, Germany) . . . "The 1958 Buyers Guide" of the magazine "Made in Europe," contains the addresses of several thousand European producers and U.S. importers listed by products. 338 pages, $3.00. (H. E. Reisner Publications, 123 Zeil, Frankfurt-Main, Germany.)

What is marketing?

"Marketing Behavior & Executive Action" is divided into three parts: Marketing and the Behavioral Sciences; Theory of Market Behavior; and Executive Action in Marketing. It does not give a clean-cut summary of the duties of a marketing executive, but it does succeed in developing a deeper appreciation of the marketing function. 487 pages, $8.40. (Richard D. Irwin Inc., Homewood, Illinois.)

YOU

Personal Affairs

Renting a Car in Europe

If you will be traveling in Europe this summer, you may want to rent an automobile for business or pleasure. It is easier than ever before.

A reservation deposit is no longer necessary. If you have a valid driver's license, just walk in, identify yourself, put down a deposit, and drive away. The car will be insured by a standard deductable policy (varying from $28 to $100). Complete coverage costs extra.

Rental fees vary from country to country, agency to agency. There might be a high per-day charge, plus a low kilometer fee—or it might be vice versa. As an average, count on paying the equivalent of $4 to $6 per day, plus about 4¢ to 5¢ per kilometer for a "medium-priced" car. The per-day charge drops with longer rental periods. There are also fixed fee plans: For about $200, you can rent a medium-priced car (say a Renault Dauphine) for a month with no kilometer charge or limitation.

It is now possible to rent a car for one-way trips. There is often no extra charge for trips between rental stations within the same country —from Rome to Florence, for instance. Otherwise, there is a collection charge. But it is well to know this: The charge for picking up a car is usually less than the rental charge for the return trip.

If you have an extra day in France, you might want to try Sabena Airlines' helicopter tour of the chateau region along the Loire valley. The tour lasts 9 hours, including a lunch stop. Cost: around $75.

And, incidentally, if you see a new small car in the Low Countries, it will probably be the DAF, built by Van Doorne's Automobielfabrieken in Holland. The new baby auto seats four passengers, has two cylinders and an automatic (belt-driven) transmission. Price: standard model, 3980 guilders (just over $1,000); deluxe model, 4350 guilders.

Russia is drawing more tourists. Brest—the Russian Brest on the Polish border—is the point of departure for automobile tours. A typical 10-day guided tour to Moscow and back costs about $165 per person (first class) for food, hotels, and guide-interpreter service—but not car rental.

Scandinavian Airlines System flies to the Soviet Union; and British European Airways and Russia's Aeroflot will have London-Moscow flights later this year.

Zoom Lens for the Amateur

One of the most striking of movie techniques is what cameramen call "traveling effect"—the subject gets larger and larger on the screen, or smaller and smaller. It is done with a "zoom" lens (the name is generic, not trade), and amateur movie makers are discovering the technique.

The zoom lens is operated by a lever; as you move the lever, the lens changes its focal length. You can switch from a general view to a close-up without interrupting the take. The zoom lens is particularly useful for filming such things as sports events and travelogues. With a direct viewfinder, the field is framed throughout the changing focal length.

Zoom lens are made for both 8-mm. and 16-mm. cameras. One manufacturer offers two models: One has a continuously variable focal length from 17.5 mm. to 70 mm. (f:2.4 lens); the other, from 25 mm. to 100 mm. (f:3.4). Prices start at around $200.

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